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TELEPHONE and Management ENGINEER

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SEPTEMBER
1956

vol 60
#9

THE NATIONAL TELEPHONE MAGAZINE

Featuring in This Issue—

★ PLANNING PLANT PRACTICES, *by T. DeWitt Talmage*
★ USEFUL IDEAS IN CONSTRUCTION TOOLS, *by John S. Reed*
★ USING TRUCKS AS MOBILE STOREROOMS, *by Richard Allen*
★ EDITORIAL — "EMPHASIS ON MANAGEMENT"
★ MODERN CABLE CONSTRUCTION, *by John S. Reed*

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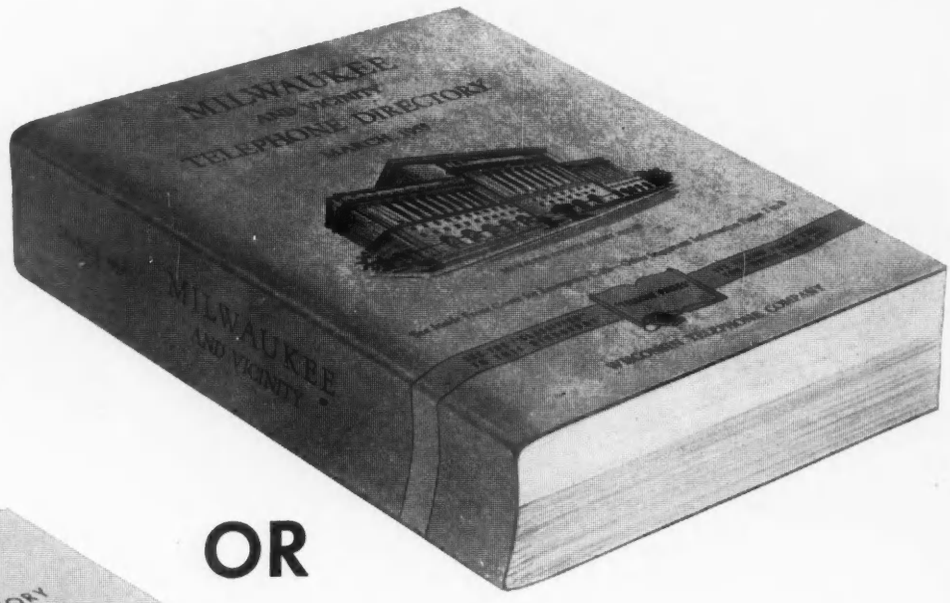

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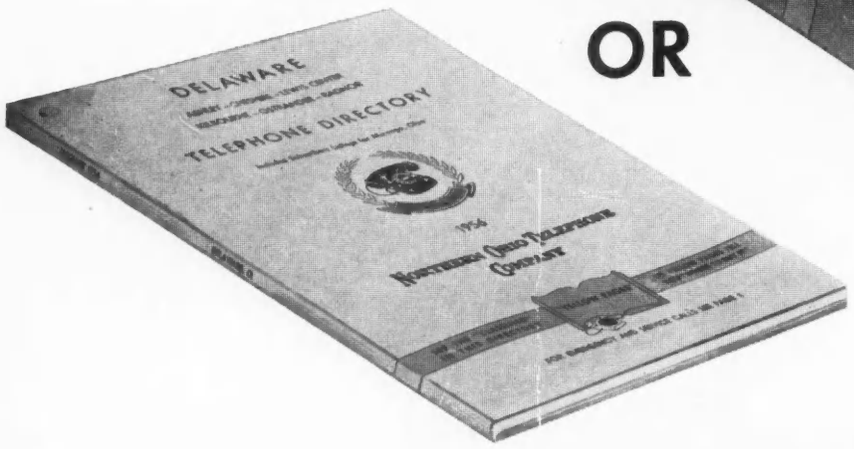

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WB *has* that which others have yet to gain . . . EXPERIENCE

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TELEPHONE and Management ENGINEER

A Telephone Engineer Publication

SEPTEMBER 1956
Vol. 60 No. 9

The National Telephone Magazine

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FRONT COVER

Celina, Ohio. General Telephone Co. of Ohio open house:—June 15th and 16th, 1956. Cable Splicer WILLARD JENKINS, demonstrates to a group of open house guests how the various wires are spliced together to form a continuous circuit. Skilled splicers like Jenkins connect each "vein" or telephone line, into the main "artery" or cable, which helps make up the complex communication system which permits telephone users to call around the world.

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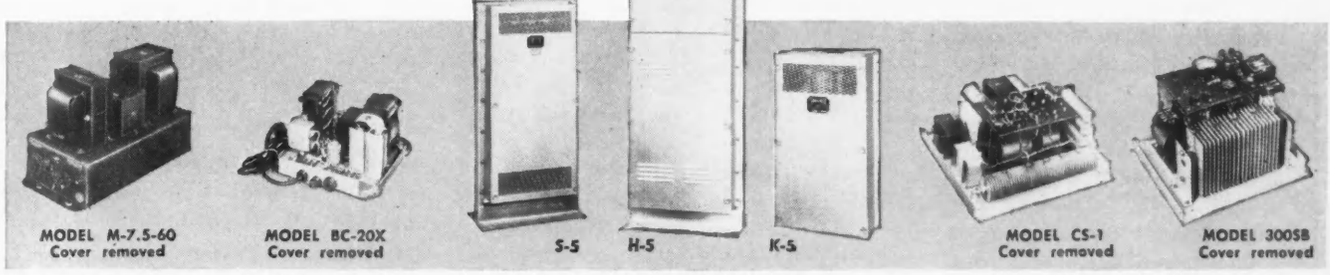
WANTED

Tough Jobs For LORAIN Ringing and Charging Equipment

We're looking for jobs that you think are too tough for our ringing and charging equipment. Of course you are seeking equipment offering incomparable performance, long wear under super-rugged service applications; try putting our equipment to the test and see how it performs more than our conservative ratings would indicate. Our complete line of frequency changing, tone generating, battery charging and power supplying devices reflects the wealth of design know-how acquired through many years of telephone power experience. All our equipment has the traditional features: no moving parts whatsoever, generously materialed with high quality components. These and other characteristics of Lorain equipment assure you reliable, economical lifetime operation.

The invention and development of SUB-CYCLE magnetic ringing machines is outstanding and is a direct answer to either single frequency ringing requirements or Decimonic, Harmonic and Synchromonic systems needs. For a number of years, FLOTROL battery chargers have been accepted as standard in the industry.

Below is some of the equipment of our manufacture.. We can't show it all — there are approximately three hundred allied items. Look it over, then write us about your requirements. Plan your installations for lowest cost — one of our engineers will help you. Then make sure planned savings keep on paying off . . . specify Lorain for any replacement or expansion need.



Relay Start Sub-Cycles

The original SUB-CYCLE ringing machine. Models for 100 to 4000 stations, with built-in audible ringing tone. Also available with pulsating output for selective ringing with biased bells.

Biased Core Converters

For heaviest loads, or for light ringing loads as in PBX service. Self-starting, excellent voltage regulation. Unaffected by power factor of load or by d-c superimposed ringing current.

Our Multi-Frequency Ringing Trio

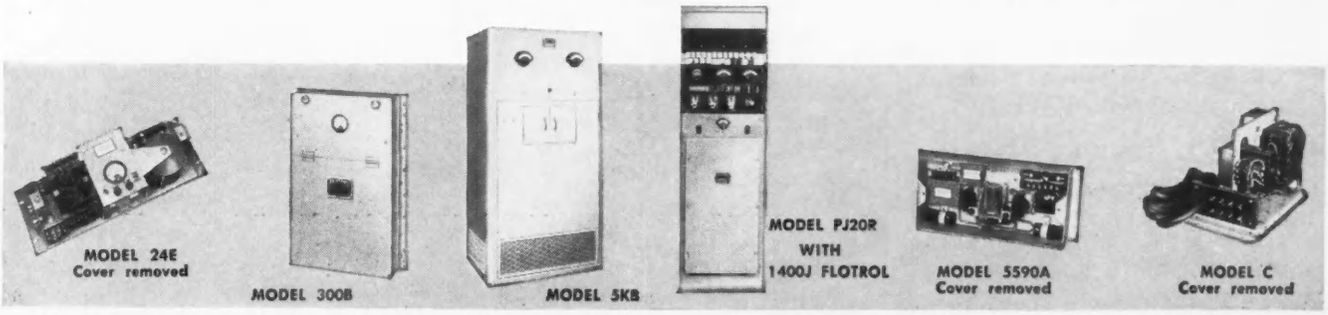
Complete line: the S-5 for Synchromonic, H-5 for Harmonic, and K-5 for Decimonic ringing, utilizing SUB-CYCLE circuits and principles of proven dependability. Adequate reserve capacity for exceptional load conditions. Positively locked ratio between the ringing and input frequencies. Regulated ringing voltage is unaffected by changes in input voltage. Also available with built-in d-c operated remote control relays.

Carrier Supply Units

Provide 130 volt plate current for carrier or repeater operation. Normally operate from 115 volt 60 cycle single phase power supply, transfer to built-in standby vibrator upon power interruptions.

Supplementary Chargers

Unregulated chargers designed to supply a relatively constant current, adjustable by a set of tap switches, to supplement the output of a standard regulated FLOTROL of equal or greater rating.



End Cell Chargers

Constant voltage FLOTROLS to maintain regulated voltage on end cells, assuring long life and full reserve capacity when needed. 2, 3 and 4 cell models available in ratings from 3 amperes to 20 amperes.

Single Phase Flotrols

Capacities up to 24 amp. Most models available as Battery Eliminators. Special model FLOTROLS with particularly low sound level for PBX installations if equipment is in a business office.

Three Phase Flotrols

For plants requiring 25 amperes or more charging capacity. Current limiting feature protects charger against overloads. Exceptionally low power consumption especially during light load periods.

Lorain Power Panels

Regulated supplies with 2.5 to 50 ampere capacity for constant and fluctuating loads. With distribution, supervision and control features. Maintain regulated voltage normally and during power failures.

Power Supply Units

For calculagraph and switchboard clock motors. Furnish low voltage 60 cycles from commercial power or from d-c source by vibrator. Complete with relay to transfer from a-c to standby vibrator.

Dial Tone Generators

Static type, models for providing high and low tones and models for low tone only. Small inexpensive compact generators which can also be run from a 60 cycle standby vibrator supply.

For complete information on any of this equipment or any other equipment of our manufacture, clip and mail coupon.

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ZONE _____ STATE _____

coming CONVENTIONS

ARKANSAS:—Arlington Hotel, Hot Springs, Sept. 17-18.

ROCKY MOUNTAIN: — Utah Hotel, Salt Lake City, Utah, Sept. 20-21.

NORTH CAROLINA:—Carolina Hotel, Pinehurst, Oct. 4 and 5.

USITA: — Conrad Hilton Hotel, Chicago, Oct. 15-16-17.

VIRGINIA—W. VA.:—Roanoke Hotel, Roanoke, Va., Nov. 1 and 2.

S. CAROLINA: — Clemson House, Clemson, Nov. 5-6.

OKLAHOMA: —Huckins Hotel, Oklahoma City, Nov. 7-8.

SO. DAKOTA: — Cataract Hotel, Sioux Falls, Nov. 8-9.

ALA.—MISS.:—Thomas Jefferson Hotel, Birmingham. Nov. 12-13.

GEORGIA: — Bonair Hotel, Augusta, Nov. 15-17.

FLORIDA: — Daytona Plaza Hotel, Daytona Beach, Nov. 19-20.

MINNESOTA: — Radisson Hotel, Minneapolis, Feb. 18-20, 1957.

LOUISIANA:—Captain Shreve Hotel, Shreveport, Feb. 27-28, 1957.

TEXAS: Plaza Hotel, San Antonio, Mar. 11-12, 1957.

IOWA: Hotel Fort Des Moines, Des Moines, Apr. 2-3, 1957.

WISCONSIN: (Hotel Not Selected), May 15-16, 1957.

ACROSS THE EDITOR'S DESK

Several Leaders Pass On

ALL MEMBERS of our great telephone industry will regret the passing of a number of Independent telephone pioneers during the past month. Such Independent stalwarts as *C. E. Eaby of* Ephrata, Penna.; *C. R. Fausold* of Kecksburg, Penna.; *John Gehr*, New Holland, Penna.; *D. E. Riordan*, Pulaski, Wisc.; *Col. C. W. Gottry* Columbia, Mo.

Just as this is being written we were notified that *Ralph Van Trine* of Durham, N. Car. had passed on following a heart attack. All of these gentlemen were friends of ours. They did much in molding the Independent segment of the telephone industry into the great future it is now enjoying and will continue to enjoy.

H. T. McCaig

FRIENDS of *H. T. McCaig*, who was with Stromberg-Carlson until his retirement and since then sales manager of the Lorain Products Co., will be sorry to learn of a recent heart attack that has hospitalized him for the past month. You may write him at his home address of 6937 31st *St., Berwyn, Ill.* As this is written he is convalescing nicely.

Merle M. Hale

MERLE M. HALE, president of the U. S. Independent Telephone Association and vice president and general manager of the Lincoln (Nebr.) Tel. & Tel. Co., hit the headlines of the Nebraska press recently on his installation as Grand Master of the Grand Lodge, Masons of Nebraska.

Booklet From Texas

CONGRATULATIONS to the officers and directors of the Texas Telephone Association and to its Executive Secretary *J. B. Haley* in particular on the new booklet "The Story of Texas Telephone Industry" which was completed and distributed during July. The 20-page, beautifully illustrated story is pocket size and has been sent by personal delivery by telephone people to their legislators, city councils, service clubs and other public organizations. We might add the booklet is one of the best of its kind that we have ever received!

For Your Address Book

WE HAVE RECEIVED several requests for addresses of telephone folks who have retired during the past year. The following, all veteran and Pioneer telephone folks of the Independent industry, have changed their addresses since retiring from the industry. *R. B. Still*, formerly of Bloomington, Ill. has moved to Texas and will be reached at 2806 22nd St., Lubbock; *Verne E. Chaney*, formerly of Chicago is now residing at 11 El Arco Drive, Santa Barbara, Calif.; *O. R. Roach*, Chicago, moved to his retirement home at Fort Smith, Ark., but has recently notified us to address him c/o Illinois Consolidated Telephone Co., Mattoon, Ill.; *R. E. Williams*, until recently headquartered in Chicago, is now living at 6140 Ensley Lane, Kansas City, Mo.; *Allen S. Crane* is now living at 1200 Elmwood Ave., Wilmette, Ill.

Rhinelander, Wis.

THE NICE FOLKS at the *Rhinelander (Wisc.) Telephone Co.* sent us an invitation to their open house that was scheduled for September 6. The occasion was sort of an informal dedication of their new building and dial equipment which was placed in service May 28. To the Messrs. Brown and Parsons we had to send our regrets and congratulations.

THE CASE OF THE "PART-TIME" PAYSTATION

The telephone company in San Angelo, Texas, wondered why a certain outdoor paystation wasn't paying as well as they expected. Seemed it wasn't "working" 'round the clock, because passers-by couldn't spot it at night.

So, a dome light was added, and the average monthly revenue jumped from $16.65 to an encouraging $34.90! The company then decided to make the booth even easier to see, and installed a spotlight. Result: the average monthly revenue hit **$50!**

Autelco Paystations in attractive booths, well-marked and BRIGHTLY LIGHTED, are bringing in handsome revenue to companies from coast-to-coast. They could be doing the same for you! Get started right —ask for our Survey Simplifier today.

Address:
Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.

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ORIGINATORS OF THE DIAL TELEPHONE

GENERAL TELEPHONE SYSTEM — INDEPENDENT

GLADWIN SALES AIDS FOR MERCHANDISING

TELEPHONE SERVICES

NOW! CARRYING CASE PROMOTES COLOR TELEPHONE SALES.

White plastic base high-lights telephone colors; clear plastic dome holds bantams in place. Easy to carry, light weight, durable; telephones always in view. Weight with telephones: 3 lbs.; size 15" x 20".

ORDERING INFORMATION
No. T-2000 Carrying case for #500 Bantam color telephones.

A TESTED SALES PROMOTIONAL AID TO INCREASED REVENUE

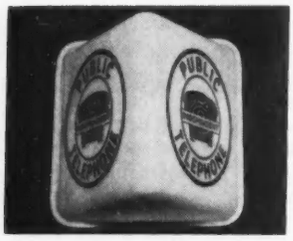
COMMERCIAL: Your salesmen will sell color installations in offices, hotels, motels, stores — all over town!

PLANT: Our holder mounted in your trucks will provide installer and servicemen with a sales case that will sell color sets, extensions and spring cords.

PUBLIC RELATIONS: Show THE COLOR STORY at CHRISTMAS and ALL YEAR ROUND. Display color telephones in super markets, hotel lobbies, drug stores, auditoriums and at banquets.

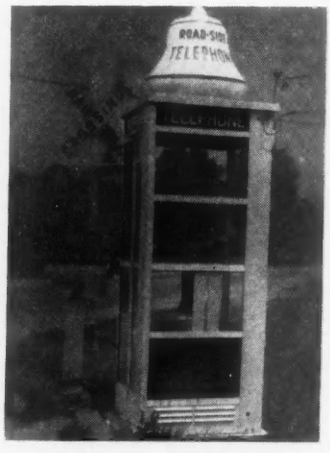
BUSINESS OFFICE: Use one or more cases for customers examination. May be displayed on walls, in store windows, carried home to sell friends color sets.

MERCHANDISING GROUPS! Have you a comprehensive merchandising program formulated to support your selling activities? We are now developing methods to merchandise Extension Telephones, Key Sets, Spring Cords, Amplifiers for hard of hearing, Hand-free Telephoning — will this help you? Let us develop your merchandising ideas.



THE TRI-DIRECTIONAL
A lighted plastic sign with any company emblem in 11x11 and 18x18 sizes for indoor and outdoor coin telephone identification.

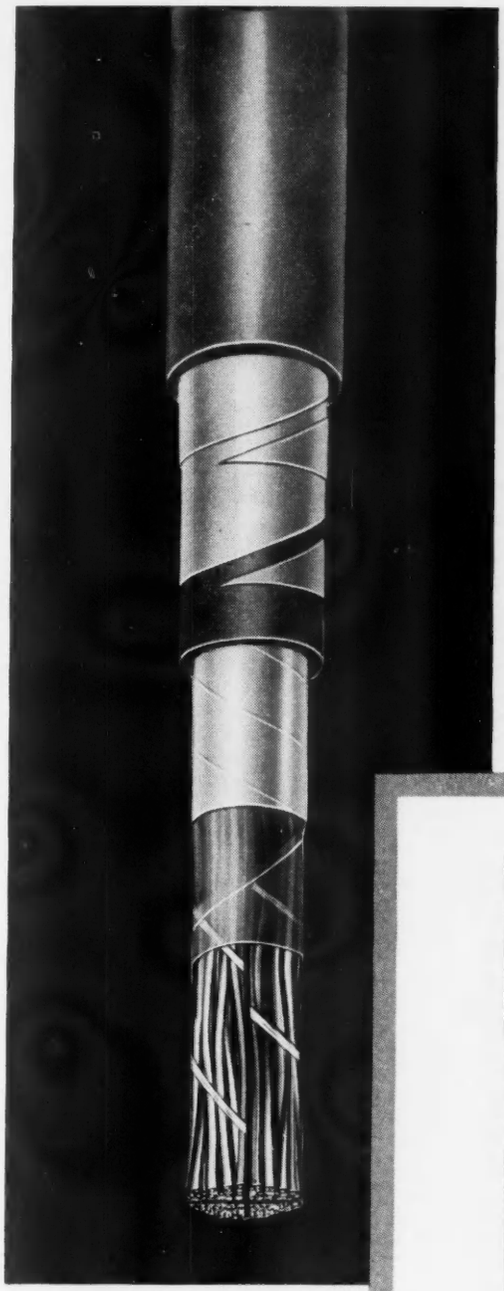
THE NEW WHITE ACRYLIC PLASTIC GLO-DOME
Increased booth sales to as much as 68%.



THE No. 1221 LIGHTED BELL
This Gladwin product has increased telephone booth revenue as much as 93%.

GLADWIN PLASTICS, INC.
275 Houston St., N.E.
Telephone JAckson 5-5384
ATLANTA, GEORGIA

SEE OUR PRODUCTS AT BOOTH #629 AT THE CONRAD HILTON.

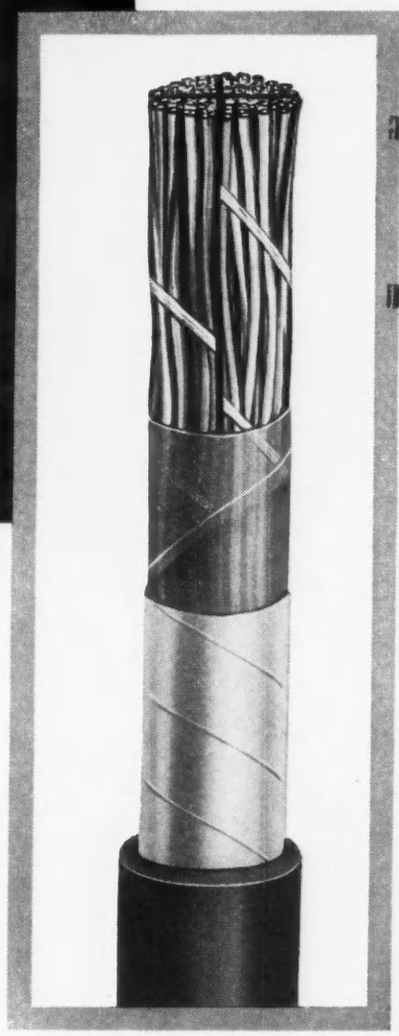


Type VII: direct earth burial

GENERAL CABLE QUALITY...

SUPERTEL

THERMOPLASTIC TELEPHONE CABLE



Type III: aerial and duct installations

SIZES 19, 22, 24
***and now in* 26, AWG**

Superior electrical quality and tough, high-molecular-weight polyethylene jacket ensure permanent high quality transmission. Withstands abrasion, bending, effects of sunlight or chemicals, low temperature deformation or cracking.

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Coast-to-Coast.

***for quality and service . . .* specify GENERAL CABLE**

FOR MORE PLEASING SERVICE

AS A STEP TOWARD making long distance service easier and more pleasing for customers to use, a number of revisions in operating practices are due to be placed in effect soon throughout the Bell System.

UNDER ONE CHANGE, the outward operator will definitely encourage the calling party to remain on the line until the attempt is completed or a report received. This will help save the time required in getting back to the customer when the party at the distant telephone is ready to talk, and also the time used in holding a long distance circuit. Meanwhile, instead of "splitting" the connection, the operator will keep the customer "tuned in" on the action being taken to complete the call. This, too, should result in faster service since, in cases where further information is required, the customer will be right there to supply it.

ANOTHER CHANGE PROVIDES that the outward operator will omit the name of the calling place in cases where calls are announced to the called telephone. Instead she will announce herself as "long distance." This will result in a simplified, uniform procedure and eliminate the problem posed by operating arrangements whereby outward long distance traffic at some points is handled by another locality.

UNDER ANOTHER NEW PRACTICE, geared for quicker service, the outward operator will accept routing directions volunteered by the customer if they appear to be complete and accurate. Also, new procedures involving the use of recorded announcements will help to space call attempts in case of serious circuit or machine overloads and thus reduce congestion. These procedures were tried out successfully last May for handling Mother's Day traffic.

EXPANSIONS & IMPROVEMENTS

JASPER (MINN.) TEL. CO., is moving ahead with its dial conversion program. Headed by Earl Seeman the corporation will put approximately $200,000 into the new installation, including work that has been completed . . . M. R. Thompson, Central Iowa Tel. Co., Toledo, Ia., announced the company plans to spend about $250,000 in a modernization program which will include converting the Eldora and Steamboat Rock exchanges to dial. . . . W. R. Trowbridge, pres. A&M Tel. Co., announced the dial conversion and rural expansion program in the Mansfield, Mo., area is progressing according to schedule. The cutover to dial operation will be completed in December . . . John Holden, pres., Cassville (Mo.) Rural Tel. Co., reports dial telephones are expected to be in use at Cassville and Purdy before the end of 1956 with future plans calling for dial service at Exeter and Wheaton . . . Southwestern States Tel. Co. officials announced completion of the new dial telephone exchange building at Grandfield, Okla. Installation of the dial equipment involved expenditure of $95,790.

FINANCING

WISCONSIN Public Service Commission authorized Wisconsin Tel. Co., to issue $25,000,000 in common stock. Money from sale of 250,000 shares at par value of $100 each, will be used to pay for additions to telephone plant and reimburse treasury for capital expenditures . . . Milton & Milton Junction (Wis.) Tel. Co., authorized to issue $35,000 in first mortgage notes. Money will be used to retire $25,000 in short term notes and pay for $10,000 of net additions to company's plant.

RATE ADJUSTMENTS

MARSHALL COUNTY TEL. CO., Minneapolis, Minn., received authority to increase rates at Alvarado, Argyle, Hallock, Kennedy, Stephen and Warren. New rates will produce 4.15% return on $1,002,216 rate base . . . Midwest Tel. Co., granted authority to increase rates at Parkers Prairie, Urbank and Miltova, Minn. New rates will earn 5.73% on $226,732 rate base . . . Illinois Commerce Commission granted the increase in rates for telephone service requested by Hutsonville (Ill.) Tel. Co. The commission stated the company will be earning 3.3% on fair value of the property. The commission ordered the Hutsonville company to rehabilitate its plant in order to eliminate the conditions set forth in the Commission's engineering staff's report and the company has been directed to make a report to the Commerce Commission on Oct. 1, 1956 on the progress of the work accomplished and to make similar reports regularly until all of the work has been completed . . . California Public Utilities Commission authorized the Dos Palos (Calif.) Tel. Co., to boost its base rates to provide a gross revenue increase of $29,500 annually. During the hearing the company, which

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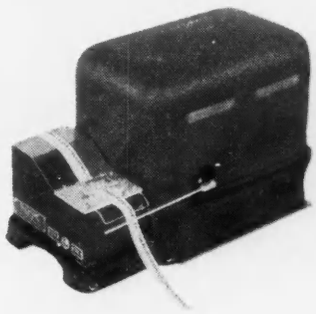
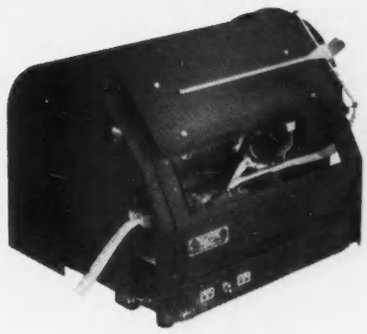


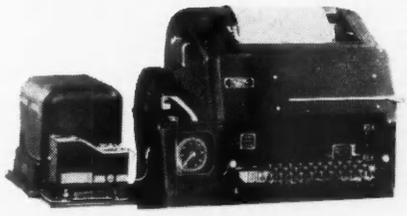
TAPE TRANSMITTER DISTRIBUTOR



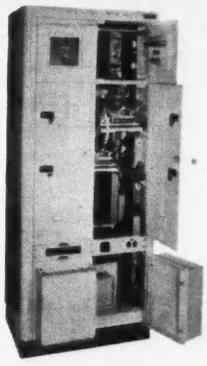
TYPING REPERFORATOR

TELETYPE EQUIPMENT MEETS THE GROWING DEMAND FOR PRINTED COMMUNICATIONS

Send-Receive Printer, Tape Transmitter Distributor, Keyboard Tape Perforator

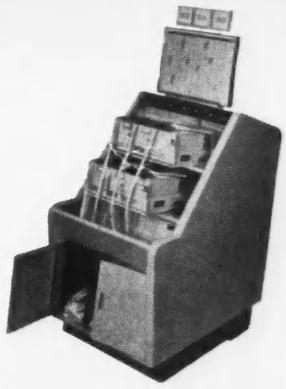


COMPOSITE SET



Receiver Cabinet

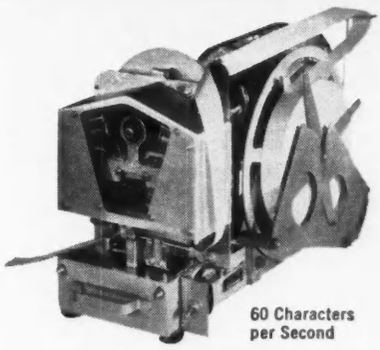
"TORN-TAPE" RELAY EQUIPMENT



Transmitter Cabinet

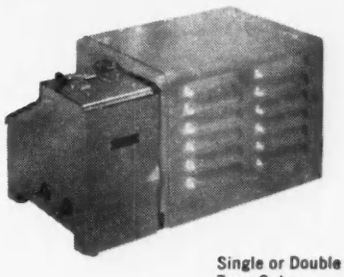
"TORN-TAPE" RELAY EQUIPMENT

TELETYPE EQUIPMENT MEETS THE GROWING DEMAND FOR PRINTED COMMUNICATIONS



60 Characters per Second

HIGH SPEED TAPE PUNCH



Single or Double Tape Gate

HIGH SPEED TAPE READER

A new issue of the booklet "The ABC's of TELETYPE Equipment" is available upon request. Write to:
Teletype Corporation, Dept. TEM 9
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4100 Fullerton Avenue, Chicago 39, Illinois

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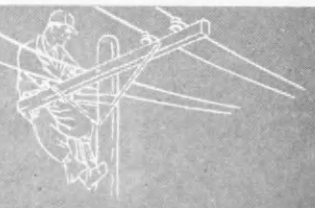


(Concluded From Page 10)

has an exchange area of about 300 square miles, reported operating at a loss, with no rate increases since 1931.

WISCONSIN PUBLIC SERVICE COMMISSION granted Sullivan Tel. Co., Jefferson county, a $3,332 annual rate increase . . . Hartington (Neb.) Tel. Co., received authority to increase exchange rates 60¢ across the board . . . Pierce (Neb.) Tel. Co., received authority to revise exchange rates in amounts ranging from 50¢ to $1.00. A rural common battery rate of $3.75 was authorized along with a rate of $1.50 for switching service . . . Hooper (Neb.) Tel. Co., received authority to increase exchange rates in amounts ranging from 50¢ to $1.25 per month.

THE HICKORY (N. C.) TEL. CO. received authority to raise its rates to produce $50,613 additional revenue annually. The amount granted by the commission was below the $195,984.48 which the company had requested. The commission's order said the increase in rates which it allowed would provide the company with a 6 per cent return on its investment. Increases requested by the company, it added, would have resulted in "considerable more" than a 6 per cent rate.

NEW YORK PUBLIC SERVICE COMMISSION accepted a tariff amendment filed by Pulteney-Branchport Tel. Co., designed to increase rates by 50 cents monthly. The company serves 170 telephone stations in and near Branchport, Yates County, through a single position magneto switchboard in Branchport. The new rates will produce about $1,020 additional annual revenue to offset operating losses which the company has incurred in each of the past two years.

NEW OWNERS

E. W. HOLDEN, pres. and manager of the Greenleaf (Kans.) Tel. Co., Inc., has announced that the stock of the firm has been purchased by John G. Foster, Miltonvale, Kans. Mr. Foster took over the management of the company August 1. Mr. Foster and his father, Joe Foster, operate the Miltonvale Telephone Co. . . . Carl Z. Watt sold Ray (Minn.) Tel. Co., to Donald G. Holsapple . . . Watkims-Kimball Tel. Co., Watkins, Minn., sold its properties to Melrose Tel. Co.

MINNESOTA Railroad & Warehouse Commission approved—(1) joint application of Farmers Mutual Tel. Co., seller, and the Runestone Tel. Association, purchaser, for approval of the transfer of all the rights-of-way and easements of the Farmers Mutual company, located in Lien Township, County of Grant; (2) joint application of Hanley Falls Tel. Co., seller, and the Home Tel. Co., Clarkfield, purchaser, for approval of the transfer of all telephone properties of the Hanley Falls Company; (3) joint application of Hillside Tel. Co., seller, and Federated Tel. Cooperative, purchaser, for approval of the transfer of all the rights-of-way and easements of the Hillside company, located in the vicinity of Chokio; (4) joint application of County Line Tel. Co., seller, and Federated Tel. Cooperative, purchaser, for approval of the transfer of all the rights-of-way and easements of the County Line company, located in the vicinity of Chokio.

PORT HOPE (Mich.) Tel. Co. purchased Kinde (Mich.) Tel. Co. . . . Sterling (Kans.) Tel. Co. purchased Hesston (Kans.) Rural Tel. Co. Oliver Unruh named Hesston exchange manager . . . Mr. and Mrs. Richard Henry purchased Conception Junction (Mo.) Tel. Co. from M. O. Morris . . . BEK Tel. Mutual Aid Corp., Steele, N. D., purchased Regan (N. D.) Tel. Co., and Tri-Township Tel. Co., Steele, N. D. . . . Dairyland Tel. Co., purchased Red River Tel. Co., Clintonville, Wis., and the Shawano, Wis. exchange operated by Wisconsin Tel. Co. . . . Walter Schweigert purchased Callaway (Miss.) Tel. Co., from Roland Starry.

MILLE LAC (MINN.) TEL. CO., purchased East Side Tel. Co., and the Garrison Tel. Co. . . . Northwestern Bell Tel. Co. purchased properties operated by Lake Elmo (Minn.) Tel. Co. in vicinity of Stillwater . . . Federated Tel. Co-op purchased rights-of-way and easement of Germania Tel. Co., Chokio, Minn.

HIGHLIGHTS

THE ELIZABETH (La.) Tel. Co., Inc., has been granted charter of incorporation listing capital stock of $100,000 . . . Two officials of the Carolina Tel. & Tel. Co., have been transferred to new posts: Dick Flye has been named manager of the company's office in Havelock, N. C., and Robert Glover has been appointed traffic manager in the Rocky Mount district . . . Curtis M. Bushnell, assistant chief of the FCC Common Carrier bureau for past six years and acting chief of the bureau for a considerable period of that time, has resigned from the Commission.

SMITHVILLE (Miss.) Tel. Co., Inc., granted charter of incorporation listing capital stock of $25,000 . . . Charter granted Ware Shoals (S. C.) Tel. Co., Capital stock is listed at $200,000. C. B. Barksdale is pres. . . . St. Helena (La.) Tel. & Tel. Co., Inc., granted charter. $100,000 capital authorized.

GUY-GRIPS eliminate clamps and reduce strand required . . . do not slip! Tests prove that even extra high-strength steel strand breaks outside the Guy-Grip when subjected to impact, repeated load or gradual tension. Save 50% installation time.

FOR "C" RURAL

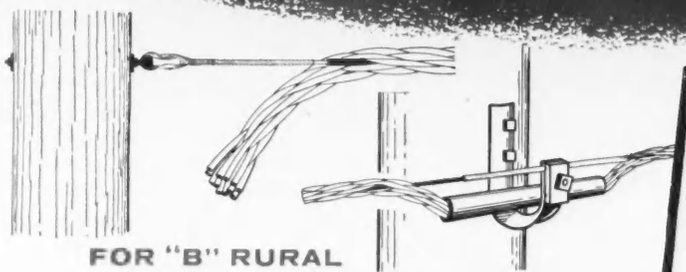
TANGENT SUPPORTS AND DEAD-ENDS

Made of stainless steel for corrosion resistance, these Preformed Tangent Supports and Dead-Ends are coated with Neoprene to cushion their grip and uniformly distribute holding pressure. Designed for 2 - #14 or 2 - #12 "C" Rural conductors, they assure a low radial pressure over the entire holding area and prevent slipping, thus eliminating a major cause of resagging. Note multiple-wire bail of Dead-End.

for the Telephone Industry . . .

PREFORMED PRODUCTS

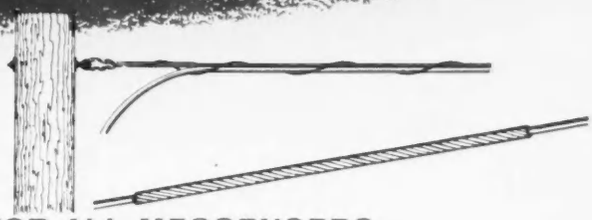
Used and praised by a growing list of leading Telephone Companies, Preformed Products are the result of *progressive* ideas backed by *extensive research* and *sound engineering* insuring the ultimate in *field performance. Ask your Telephone Supplier for complete details of their exclusive advantages.*



FOR "B" RURAL

PREFORMED DEAD-ENDS are the easiest-to-install, non-slip answer to dead-ending. Can be installed without cutting messenger.

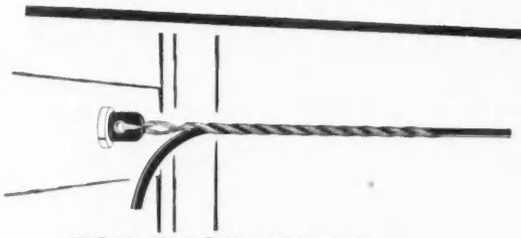
PREFORMED ARMOR RODS protect insulated messengers against clamping pressure or abrasion damage.



FOR ALL MESSENGERS

PREFORMED DEAD-ENDS AND SPLICES are the surest, safest and non-slip means of splicing and dead-ending all sizes of messengers. Easy to install . . . no tools required.

PREFORMED LASHING RODS, individual Preformed Rods designed to lash cables to messengers require no clamps. Neat. Easy to install. No tools needed. Can be removed and reused.



FOR DROP-WIRES

DROP-WIRE DEAD-ENDS of stainless steel . . . Neoprene coated . . . cushion the grip; eliminate abrading or cutting through insulation; provide low radial pressure over the entire holding area . . . no damaging concentrated pressures. No slippage or cold flow. Multiple-wire bail prevents fatigue failure.

FOR SELF-SUPPORTING CABLE

PREFORMED DEAD-ENDS AND LINE GUARDS with their large-area, uniform, low-pressure contact surfaces are the only devices in their classification that can be used safely with plastic-covered multiple cable. They were specially designed upon request for this use.

Made in accordance with or for use under one or more of the following U.S. Patents: 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

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NEW COMMUNICATIONS INDUSTRY SHAPING IN THE U. S. A.

IT MAY HAVE ESCAPED the notice of many observers, but the greater share of the factors which are causing a whole new communications industry to take shape in the United States are tied up in a case which until recently has been before the Federal Communications Commission. In a way, the proceeding involving the multiple channel private line "volume rate" tariff of the Bell System is still before the FCC, since the tariff is to be included in the Commission's so-called general investigation of Bell System and Western Union Telegraph Co. private line services.

THE TARIFF, however, has been allowed by the Commission to go into effect, at the urging of the American Telephone & Telegraph Co. and Defense Department and, figuratively if not literally, over the dead corporate body of Western Union. Briefly, the tariff permits big users of private line services between any two given points to get reduced rates if they use enough services — in combination, rather than service by service. Users of telephone grade channels, for example, whether for voice or telephotograph purposes, get cumulative credit for the channels used and a reduced rate if they use more than the equivalent of three telephone grade channels. If they use "other than telephone grade" channels, such as for morse telegraph or metering services, the same principle applies. Also, there are reductions as the distance between the two key points increases.

THE BELL SYSTEM DECLARES, in submitting and urging adoption of the tariff, that it is meeting the needs of big customers and observing the economics of the broad band plant now being installed. Western Union says, on the other hand, that the multichannel approach will be fatal to it, since it cannot provide voice services and thus cannot meet the competition for integrated data processing and other private systems — which is where the money is now, in the telegraph if not in the telephone business.

FOR THOSE WHO CAME IN LATE, incidentally, the new multichannel tariff, now in effect, is a revision of the one which AT&T submitted about a year ago and the FCC suspended, after a similar Western Union protest. The FCC suspended the original filing for 90 days, the maximum allowed by law, and the Bell System voluntarily extended the suspension.

HOW DOES THE MULTICHANNEL TARIFF fit the new look, or the new problems, of the communications industry? *Number one — technological advances.* Big broad band systems between major centers offer major economies, provided that the many channels they provide are used, and not allowed to sit idle. When a major governmental or business user leases a system for 24 hours a day, he uses it for communications traffic during the business day. But, if he can use the same circuits in the off-peak hours for telephotograph or facsimile traffic, pouring a mass of statistical, accounting, sales, and other data into his integrated data processing center for storage, collation, and later use, he is getting 24 hours of use out of the channels at no additional leasing expenses. He's getting the most out of the facilities, and so is the communications company which leases the channels.

NUMBER TWO — GROWTH OF PRIVATE SYSTEMS. Like it or not, it's to the advantage of a government agency or business, usually, to lease circuits instead of paying a message rate every time it sends a telephone or teletypewriter message between its big centers — say its headquarters in one city and its biggest manufacturing plant or sales office in another city.

THIS TREND HAS BECOME MORE SWEEPING and obvious in the telegraph industry, where the message business is slowly drying up and the future of Western Union obviously is in the lease business, than it is in the telephone business, with its much higher proportion of social use, its tremendous local exchange services, and its greater use by small business and firms without big centers in two or more points. But, to a degree, it is also present in the telephone field, particularly as intercity plant goes up and up in capacity.

THE THIRD IS AN OUTGROWTH OF NUMBER TWO, and consists of the very important factor of the competition of private radio systems. This is a whole field in itself, and one that much more will be heard of. Suffice it to say that it is one of the most important reasons why the Bell System developed the multichannel approach in the first place. One of the major selling points of microwave manufacturers is that their systems can be used for telephone, telegraph, teletypewriter, metering, or whatever communications purpose the licensee and owner decides they should be put to.

Please turn to page 18

REX Wires & Cables

EXCHANGE AREA CABLE

No. 24, 22 and 19 AWG — Soft bare copper, polyethylene insulated, cabled, polyethylene taped, aluminum shielded, polyethylene jacketed. For aerial and duct service.

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No. 24 Copper — Color Coded Polyvinyl insulated Conductors cabled around galvanized steel messenger. Available in 16 pairs only. No. U.D.C. - 1619-U.

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PVC Insulation and Ripcord Jacket

6 pr. No. 24 B.C. — Overall PVC Jacket O.D. .310
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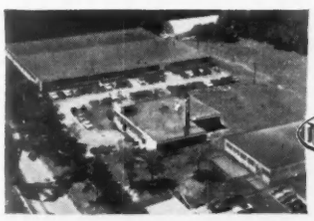
RURAL DISTRIBUTION WIRES — REA APPROVED

Polyethylene insulated — color coded polyvinyl jacketed conductors. 19 insulated conductors cabled around steel messenger. 3 pr., 6 pr., 11 pr., 16 pr.



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Poor old hapless Lineman Daw
Left the guard off a razor-edged saw—
Stopped his truck with a sudden swerve
The results as you see rather tested his nerve!

You might like to post this ad as a reminder that accident prevention is not a matter of good luck, but of good safety practices.

It's a matter of *proper safety equipment*, too. And whether you need tool guards, safety straps, safety chairs, fire extinguishers, or anything else in the safety line, remember: You'll find it in our big Supply Catalog. To place your order, call your Automatic representative or your nearest Automatic Electric Sales Corporation warehouse.

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GENERAL TELEPHONE SYSTEM

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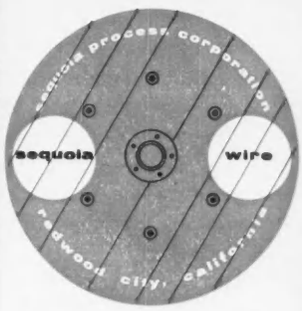

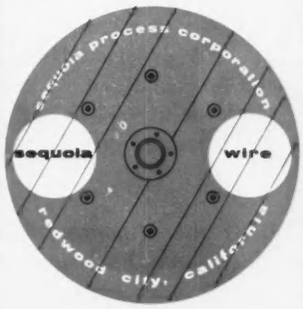

Our West Coast facilities are making cable now....

In June our Redwood City, California, plant shipped its first order of telephone cable—manufactured on the most modern equipment obtainable. Meticulous quality control, we believe, makes this cable as good as any of its type ever made. More new processing equipment is now being installed.

And our delivery situation is this....

Depending somewhat on the size of cable you require, we will be able to make delivery in 60 days (or better). We have some popular sizes available from stock. As we are located in the West, shipping time to western users will be only a matter of several days.

We offer you more than telephone cable....

Sequoia feels that service is an important part of sales. We can and want to provide you with engineering assistance. May we analyze your installation, splicing and other problems and have our experienced engineers help supply solutions?

If you're near San Francisco, won't you visit our plant?

Sequoia is new in the telephone business, although for years we have been making electronic wire and cable to meet rigid military specifications. We want to meet you and have you visit our plant and facilities. In Redwood City, just 30 minutes south of San Francisco, via Highway 101.

You know Harry Burd....
Harry Burd, a veteran in the telephone field and one of the best known men in the cable manufacturing industry, has joined Sequoia as a special consultant for manufacturing and marketing.

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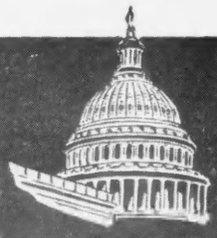

(Concluded From Page 14)

THE FOURTH IS ANOTHER THAT HAS CROPPED UP in numerous areas, and much more will be heard of it. This is a combination of the other factors, and consists of the relationship of the Bell System, with its expanding plant, technological improvements, ability to provide more and different services, and skilled personnel, with smaller and more specialized communications organizations. In the multichannel case, the smaller entity is Western Union — which, despite the impression its offices across the country and its advertising program might have left, is minuscule alongside the nation's telephone business.

FIFTH, AND LAST FOR THE MOMENT, is the growing impact of the government, and national defense, on the operations and planning of communications companies. This is felt through decentralization of defense installations, as one example, and the growth of integrated data processing by the armed services. In the multichannel case, this factor has come up through the desire of the Defense Department and United States Air Force to use the multichannel services for its well-known and long-discussed semiautomatic ground environment (SAGE) system of air defense.

INTERVIEW WITH HAMIL

HIS INITIAL APPRAISAL of the Rural Electrification Administration's farm telephone program indicates much greater complexity and a wider range of problems than the REA electrification program had at a comparable stage in its development, REA Administrator David A. Hamil has declared.

IN AN EXCLUSIVE INTERVIEW with *Telecommunications Reports*, Washington correspondents for *Telephone Engineer & Management*, on his first weeks in the REA assignment — devoted to a large extent to traveling, to learn the problems of the job first hand — Mr. Hamil said that the larger number of problems is due partially to the need to interconnect all telephone subscribers, in contrast with electric service.

BUT MORE SIGNIFICANT, he declared, is that a large number of farm areas have had "some kind" of telephone service, and franchise or territorial rights have been granted to a great variety of telephone operations, many of which are too small to meet the feasibility requirements of an REA telephone loan.

The new Administrator said flatly that he expects to designate a telephone advisory group similar to that which functioned under former Administrator Ancher Nelsen. Mr. Hamil stressed, however, that he will not name his advisers until he is personally acquainted with them and is sure he will have confidence in their recommendations, since he expects "to be around here a while." He said he believes firmly in the value of an advisory group of telephone operating men, since the REA borrowers must operate with all segments of the telephone field.

MR. HAMIL REPORTED that the results of the survey of the telephone field, commercial and cooperative, recommended by the former advisory group, and aimed at obtaining comments on the REA program from all comers, are now being digested and analyzed. It is expected that the more than 1200 useful replies will be ready in summary for study by interested groups in the immediate future.

PARTICULARLY PRAISING the *Mountain States Telephone & Telegraph Co.*, which serves his home area, and the *General Telephone System*, with which he has become acquainted since his appointment as REA Administrator, Mr. Hamil said that on the whole "pretty good cooperation" has been developed with the telephone industry.

HE POINTED TO THE 12-18 month delivery time for central office equipment and the continuing shortage of telephone engineers as problems which are serious but should work themselves out in time. In the early days of the electrification program, he recalled, equipment deliveries were slow until the manufacturing industry geared itself to the demands of the new group of purchasers. He expressed confidence that, with the increasing demand for telephone engineers, more and more will be turned out by the nation's colleges.

OVERALL, MR. HAMIL SAID, he believes the industry is gradually becoming convinced that the REA program is "non-socialistic," and that he and his predecessors meant what they said about their interest lying in getting telephone service to farmers without concentrating on organizing large numbers of co-ops.

LAUDING THE REA TELEPHONE STAFF — he attended an REA field telephone meeting immediately after he was sworn in — Mr. Hamil had special praise, too, for Deputy Administrator Fred H. Strong. He emphasized that as Administrator he is responsible for policies, but that Mr. Strong is particularly helpful in the administrative work of the agency and in his knowledge of the many facets of the job.

This Wheel of Fortune pays off every time!

IN SATISFIED SUBSCRIBERS! Your good will skyrockets when you provide subscribers with Stromberg-Carlson dials. Their smooth operation is soft and easy on the ears, and the numerals on the outside scratch-proof plastic number plate will stay legible for years and years.

You'll have fewer adjustments, too, because the rugged die-cast aluminum housing keeps all moving parts in rigid alignment—even when the 'phone is accidentally dropped.

IN FEWER ADJUSTMENTS! Wear of the Stromberg-Carlson dial is reduced to a minimum . . . on wind-up, only the main and secondary shafts move—other parts move only for impulsing. The rugged aluminum housing holds parts in rigid alignment; adjustments are rarely needed.

IN LOWER LABOR COSTS! The lock between number plate and housing rim is tamperproof. But in a matter of seconds, your serviceman can separate them by removing a single screw! Then, to adjust the speed, or clean the contacts, he just flips open the trap door in the dust cover—no need to remove the cover or disturb the connections! Less time on the job means lower costs for you!

Make this dial your wheel of fortune. Call or write your Stromberg-Carlson representative for data, prices.

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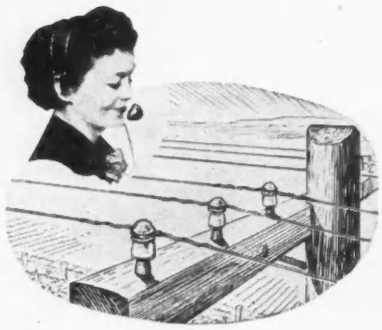
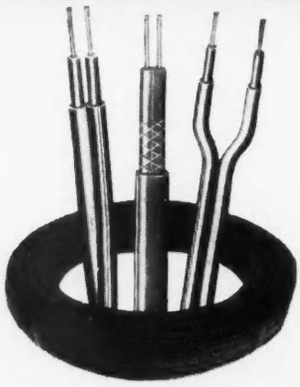


Copperweld Talks Better than any other high-strength conductor. Strong, non-rusting, easy to string, it's unequaled for long-life, long-span construction. Use .080"-30 E.H.S. for short subscriber loops and secondary toll lines—and .104" H.S. -40 for toll lines and long subscriber loops. COPPERWELD STEEL CO.



Long Service Life and Low Plant Costs go hand in hand with the installation of ENDURPRENE—The Neoprene Drop Wire available in both Copperweld and Bronze. This flexible and easy-to-handle wire is made by GENERAL INSULATED WIRE WORKS, INC.

Kellogg's Standard Outside Plant Handbook now available at special price while quantities last. Reduced to $2.75 a copy with ten or more copies priced at $2.50 each. Every phase of outside plant telephone pole line construction is covered in book.

Mobile Power Unit for use by telephone cable splicing crews, for lighting, operating solder pots, solder irons, and electric blowers for ventilating manholes, with a centrifugal or diaphragm pump to keep manholes dry. S&G MANUFACTURING CORP.

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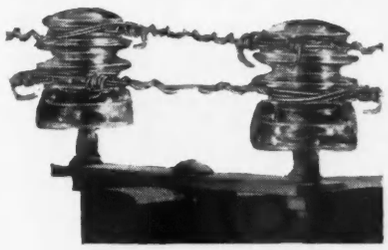
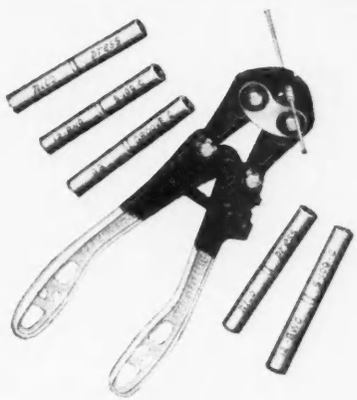


Double-Groove Transposition Insulator (No. 56) is employed for all circuits (exchange, toll, or trunk circuits) that employ tandem type transposi- the high quality of these Hemingray tions. The test of time has proved Insulators—a product of OWENS-ILLINOIS.

Versatile Plastic Screw Anchor meets needs of telephone industry. For use in all materials from plasterboard to concrete, indoors and out. Nine sizes for screw sizes 5 through 20 and ¼" through ½" Lag Screws. Bonding and fusing action. No special tools required. Savings up to 70%. HOLUB INDUSTRIES, INC.



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Exchange, Quadded and Composite: Type 775-P for Aerial and Duct Service, Type 775-AP Armored for Direct Burial, Type 775-P-SS Self-Supporting using Channell Supports, Type 2094 to REA Spec. PE-14. Rural Distribution Cable. ANSONIA WIRE & CABLE COMPANY.

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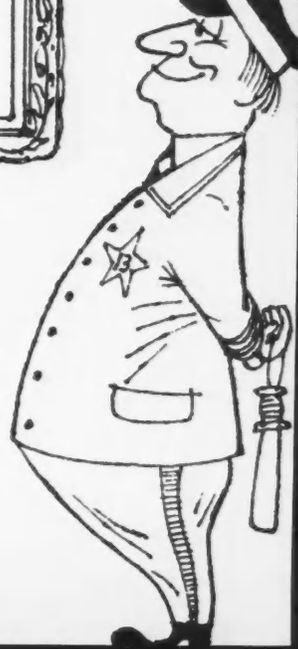

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PHONE: DEarborn 2-0750

Carolina Co-ops Form New Telephone Association

REPRESENTATIVES of 10 telephone co-operatives in North Carolina and South Carolina organized the Tri-State Association of Rural Telephone Co-operatives Inc. last month and voted to take legal steps "in protecting" their interests as a result of a ruling of the North Carolina Utilities Commission.

They elected L. A. Edwards, Clinton, N. C., president of the new organization and authorized him to arrange a conference with Gov. Hodges "for the purpose of outlining the purposes and problems" of the co-operatives.

The North Carolina commission last month ordered Central Telephone Co. to provide service for seven Randolph County residents over the protest of the Randolph Telephone Membership Corp., which insisted that the seven persons live within territory assigned to it.

Southern Bell Buys Winona (Texas) Tel. Co.

A RECOMMENDATION that Southwestern Bell Telephone Co. be authorized to buy the Winona (Tex.) Telephone Co. for $13,000 was submitted last month by FCC Commissioner Jay Kyle.

Southwestern plans to install modern equipment at the exchange and raise rates.

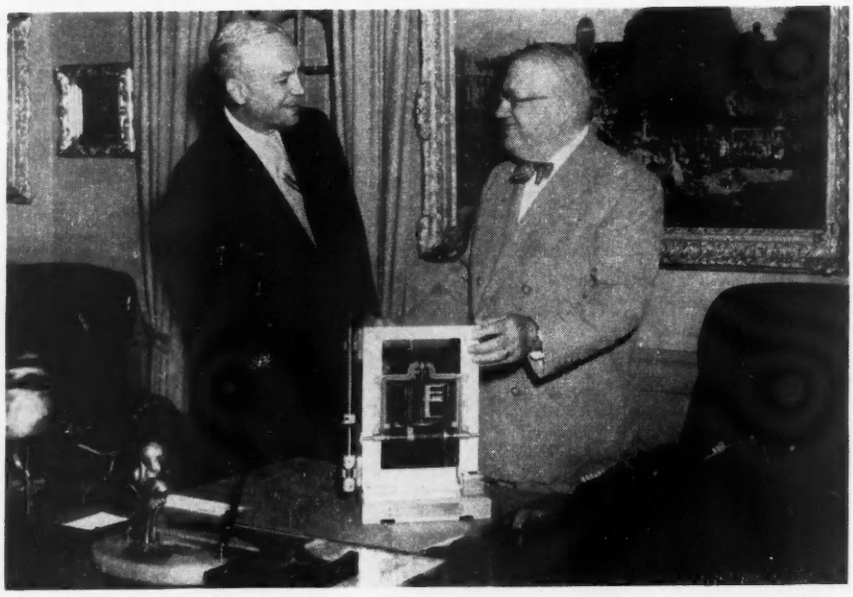
General of N. W. Names L. D. Briney, Traffic Engr.

THE APPOINTMENT of Laurence D. Briney to the position of general traffic engineer was announced last month by Walter A. Boro, general traffic manager for General Telephone Co. of the Northwest.

With the assumption of his new duties last month, Briney returns to the company's Spokane, Wash., office from Chelan, where for the past year he has held the position of Chelan district manager.

He is a native of Ponca, Neb., and started with General of the Northwest as a plant accounting clerk in the Spokane office in January 1946. He was made accountant in September 1949, and subsequent promotions moved him up to the position of chief accountant within the following four years. He was named general accountant in March 1955 and transferred to Chelan as district manager there last September.

He is a graduate of Ponca high school and studied accounting at Kinman Business University in Spokane.



HISTORICAL SWITCH:—At a small informal presentation ceremony held at Dallas, Pa., home of the Commonwealth Telephone Co., RAYMOND S. PERRY (above, left) president, Federal Telephone & Radio Co., presented Senator ANDREW J. SORDONI, chairman of the board, Commonwealth, with a friction driven rotary switch to add to his famed museum of telephone equipment. This rotary switch was used in the 7A rotary telephone system, first rotary system ever designed, and was an important unit in the operation of a telephone exchange at Zurich, Switzerland, from 1917 to 1953. (The 7A system is a forerunner of today's 7A2 system which is used extensively throughout Europe and South America.)

Rate Increase Granted Clymer (N. Y.) Tel. Co.

The New York Public Service Commission has accepted a tariff amendment filed by Clymer Telephone Com-

pany, Inc., designed to increase rates for each type of service by 25 cents monthly. The company serves about 600 telephones.

Western Carolina Tel. Co. Closes $500,000 Mortgage

RALPH G. STARKE, assistant vice president, Berkshire Life Insurance Co., Pittsfield, Mass., recently reported that Western Carolina Telephone Co., Weaverville, N. C., has closed a $500,000 25-year First Mortgage loan with Berkshire. Purpose of the financing was for the refunding of bank notes incurred in the company's construction program. This is the second bond issue which Western Carolina has arranged with the same lenders.

New Rates Approved for Midstate Telephone Co.

THE NEW YORK Public Service Commission has accepted a tariff amendment filed by Midstate Telephone Co., Inc., designed to increase rates by an estimated $49,750 effective August 15. For some company subscribers, this is the first rate increase in 28 years.

The company, formed by a merger of four separate firms in 1951, serves about 5,100 telephone stations through dial offices in Manlius, Central Square, Brewerton, Munnsville and West Winfield. Ten years ago, when the present management assumed control of the four component firms, it served only 1,500 stations. During the last decade its plant investment has increased from $150,000 to $1,000,000 and the four exchanges previously providing manual service have been converted to dial operation. In 1953 the company also provided toll-free service for subscribers of its Manlius exchange to the Syracuse and Fayetteville exchanges of New York Telephone Co.

Present rates for its Central Square, Brewerton and West Winfield exchanges have been in effect since 1928, for the Munnsville exchange since 1939 and for the Manlius exchange since 1953.

In filing its new tariff, the company reported that additional revenues were necessary to offset recent increased operating expenses. The new monthly line rates for its Manlius exchange are the same as those charged by New York Telephone in Syracuse and are as follows: Residential service, individual line, $5.25;

(Continued on page 26)

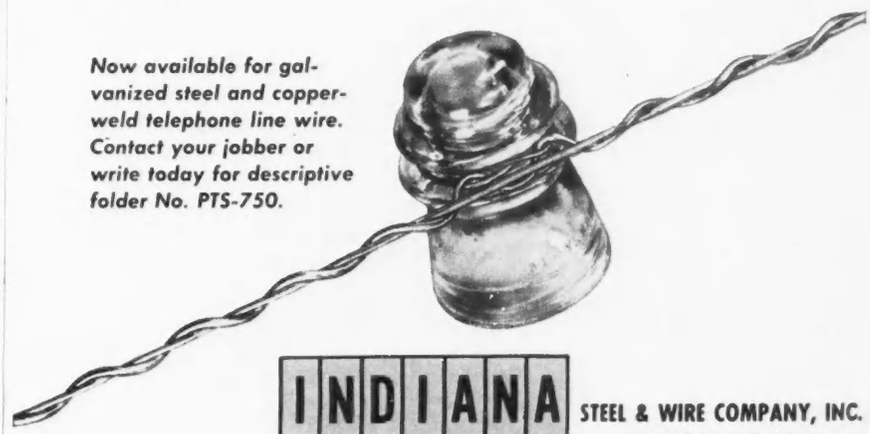
SOMETHING **radically new** IN TIES

Here's a new — radically new — time and labor saving method of "tying-in" telephone line wire. The tie splint can be tied to the insulator BEFORE the insulator is mounted on the pole.

Crapo Pre-Tied Splints completely revise older methods of tying. The splint, simplified tie and insulator can be preassembled on a "production line" basis in the shop or at the job site. This saves time, cuts tying costs and minimizes the chance of making loose ties.

Crapo Pre-Tied Splints protect the line wire against wear and abrasion because there is no contact between line wire and insulator and line wire and tie wire. The line wire can be removed, re-sagged and replaced without disturbing the tie wire.

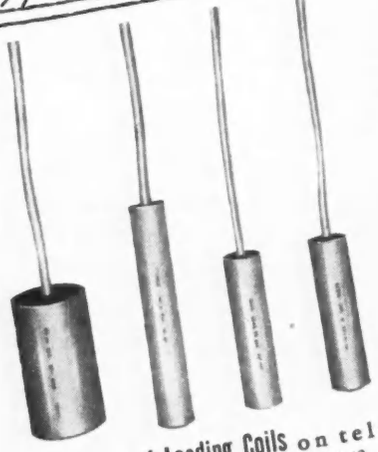
Now available for galvanized steel and copperweld telephone line wire. Contact your jobber or write today for descriptive folder No. PTS-750.



INDIANA STEEL & WIRE COMPANY, INC.
MUNCIE, INDIANA

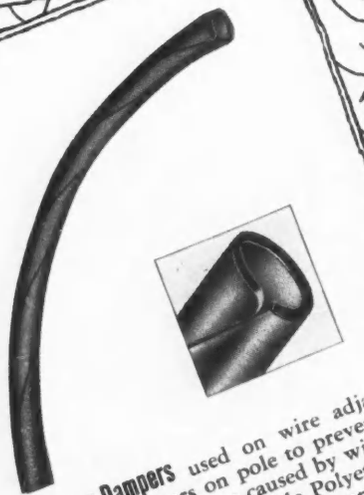
CHECK THE ADVANTAGES AND YOU WILL

VOTE for line supplies from KELLOGG



Application of Loading Coils on telephone circuits reduces loss to 1/3 or 1/4 the non-loaded value — coils shown are used on a 2-wire telephone circuit in non-quadded paper insulated or plastic cable. COMMUNICATION EQUIP. & ENGR'G. CO.

Kellogg's Standard Outside Plant Handbook now available at special price while quantities last. Reduced to $2.75 a copy with ten or more copies priced at $2.50 each. Every phase of outside plant telephone pole line construction is covered in book.



Vibration Dampers used on wire adjacent to insulators on pole to prevent fracture from fatigue caused by wind vibration. Made of flexible Polyethylene, and helically slit with approximately three turns to the foot. DETROIT MACOID CORPORATION.

Outstanding Battery Performance is yours when you choose Gould Plante Batteries. Thick, grooved, pure lead, positive plates give many years of trouble-free service! Made by GOULD-NATIONAL BATTERIES, INC., a leader in their field. They're the finest money can buy.

Here's the Kellogg Platform!

- Top-quality line supplies
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- Experienced telephone men handle your order
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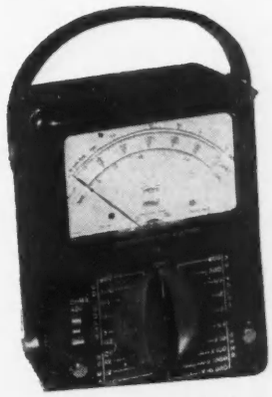
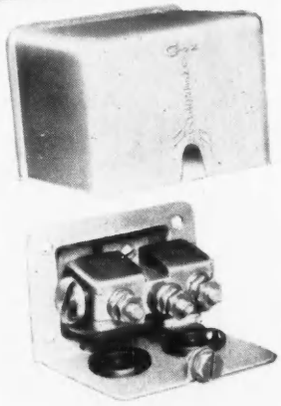
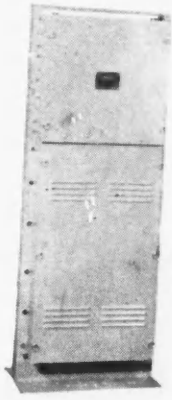
Distribution Wire—Extend service economically and quickly by installing 3, 6, 11, or 16 pair Distribution Wire. Polyethylene insulation, color-coded with polyvinyl chloride covering over each conductor. Self-supporting. WHITNEY BLAKE COMPANY.



Tailored for Needs of Telephone Industry—the 630-T Volt-Ohm Milliammeter is designed for work inside on panel, checking circuits on poles, etc. Supplied with adjustable neck strap, hand strap, and special test leads. THE TRIPLETT ELECTRICAL INSTRUMENT CO.



The NEW Cook Interceptor is a fuseless, carbon-to-carbon arrester which grounds power cross surges and lightning. Mini-gap arresters are mounted in a moisture-resistant and dirtproof receptacle — no grounds due to dirt or insects. COOK ELECTRIC COMPANY.



H-5 Subcycle for Harmonic Ringing Frequencies. Produces all frequencies in harmonic series, 16 2/3, 25, 33 1/3, 50 and 66 2/3 cycles. Ringing frequencies locked to AC line frequency. Maintenance-free operation. LORAIN PRODUCTS CORPORATION.

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four-party and rural lines, $3.60. Business service, flat rate individual line, $14.25; message rate individual line, $7.00; rural line, $5.60.

New rates for the other exchanges are as follows: Munnsville and West Winfield exchanges: Residential service, individual line, $4.25; four-party and rural lines, $3.00. Business service, individual line, $6.25; four-party and rural lines, $4.50. The West Winfield rates include toll-free service to the Leonardsville office of Chenango and Unadilla Telephone Company. The present handset surcharge for subscribers of the Munnsville exchange will be discontinued.

Central Square and Brewerton exchanges, between which toll-free service is provided: Residential service, individual line, $4.75; four-party and rural lines, $3.25. Business service, individual line, $7.25; four-party and rural lines, $5.50.

Extension station rates for all exchanges will be $1.00 monthly for residential service and $1.50 monthly for business service.

Oslo Considers Bonds To Pay For Telephone

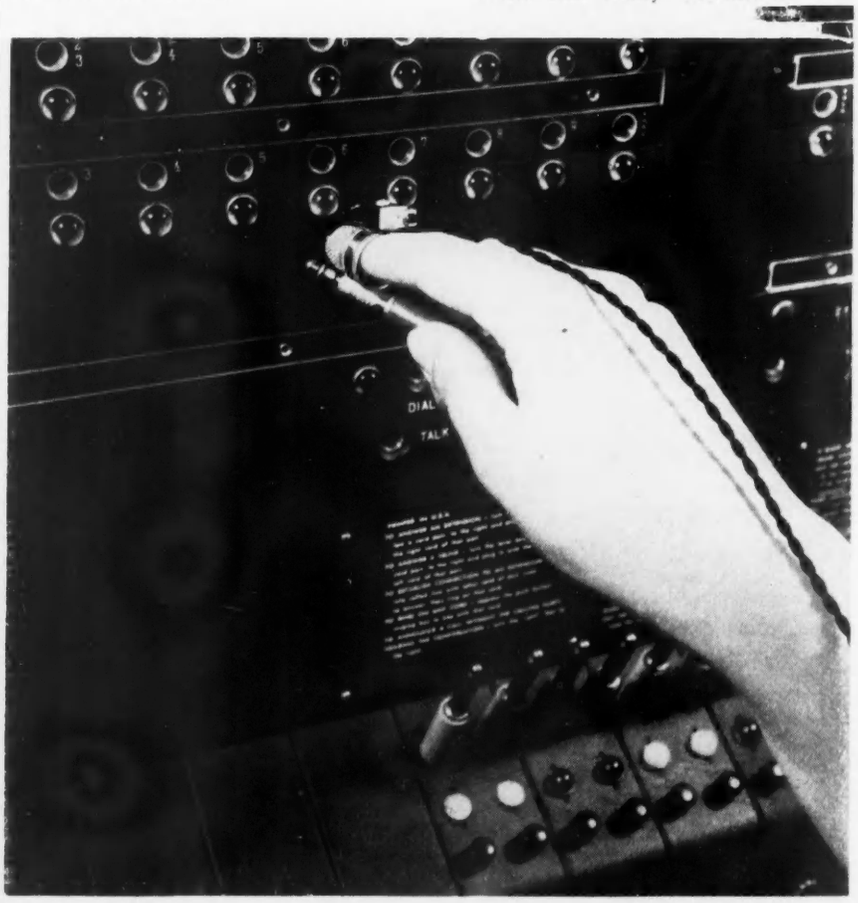
IN OSLO, NORWAY, it may soon be necessary for a subscriber to buy a bond to get a telephone. This is one plan being considered to finance the cost of developing the state-owned telephone network, which has admitted it cannot keep up with demand.

Since before World War II there has been a continuous shortage of telephones in the Norwegian capital and patient would-be telephone subscribers have had their names on the waiting list for many years.

Today, 11 years after the war, the state telephone and telegraph authorities are struggling to catch up with that long waiting list. But the continuous increase in the population of the city and the rising standard of living, means the list gets longer each year.

There are now 100,000 people on the waiting list for telephones in Norway and 24,000 of them live in Oslo.

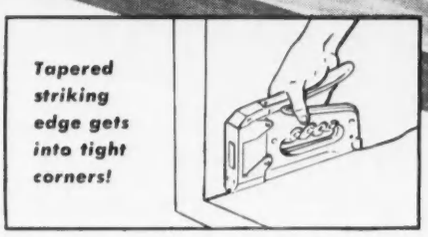
With her many mountains and



CLOSEUP OF ELECTRONIC "EYE" announced by Bell Telephone Laboratories as an aid to blind operators of private telephone switchboards. Fingertip phototransistor device weighs less than an ounce and detects lighted lamp marking incoming call. Operator hears signal of call coming in, then searches along lines of lamps with light-sensitive device. On reaching lighted lamp, she hears signal through headset and plugs cord into jack associated with the lamp, completing connection.

One Arrow staple gun fastens them all!

ONLY ARROW'S T-25 STAPLE GUN TAKES 3 STAPLE SIZES TO FASTEN ANY INSIDE OR OUTSIDE WIRE UP TO ¼" DIAMETER!



- T-25 staple gun holds ⅜", 7/16", and 9/16" round crown, rust resistant staples, a full ¼" in width.
- Safe! No short circuits possible automatic mechanism stops staple at right height
- Short span handle provides comfortable grip – minimizes fatigue.
- Arrow tackers are jam-proof! Can't jam even when struck against metal! Never any lost time on the job. Fully guaranteed
- No wire sag ever! If staple used doesn't hold wire taut, simply use next shorter leg length to insure firm hold and neat job.
- Staple leg lengths are long enough to insure firm hold in wood, plaster or composition board, etc. Tack-pointed staple legs diverge to give even greater holding power.
- Check staple supply in tacker simply by looking on underside of gun.

T-25 LIST PRICE: **$15.00**

Try Arrow without obligation!
Tackers will sent on approval for testing purposes. Send request to Telephone Division.

Available at your regular supply house. Priced for volume use!

ARROW T-75 FOR ANY INSIDE OR OUTSIDE CABLE UP TO ½" IN DIAMETER!

- T 75 tacker holds 9/16", ⅝" and ⅞" tack-pointed, rosin coated staples, a full ½" in width.
- Fastens 21 pair inside wiring cable, 26 pair, 12 pair wires, etc.
- Has all above mentioned Arrow features (except tapered head) to insure maximum speed and efficiency of operation!

T-75 LIST PRICE: **$15.00**

ARROW FASTENER CO. INC. 1 Junius Street, Brooklyn 12, N. Y.

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THE THRILL THAT ONLY GOOD TOOLS CAN GIVE

"Since 1857"

It's a pleasure to use good tools —pliers that grip tight . . . that cut through tough wire easily . . . that reach confined spaces.

Linemen and electricians know that they can rely on their Kleins—side cutters, long nose, oblique cutters—famous for quality for a century.

There is a Klein Plier exactly suited to every electrical need—carried in stock by better electrical suppliers everywhere.

Write for your FREE copy of the Klein Pocket Tool Guide listing Klein equipment and giving valuable information.

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fjords and great distances between built-up areas, Norway is a difficut country to service with telephones. But the fact that the population is so scattered makes the need for telephone service greater.

J. P. Christensen Joins General Tel. of Kentucky

THE PROMOTION of James P. Christensen, building and methods engineer of General Telephone Co. of the Northwest, to the position of chief engineer of General Telephone Co. of Kentucky has been announced by W. R. Jarmon, president of General of the Northwest.

A native of Idaho Falls, Christensen graduated from the University of Idaho in 1947 with a bachelor of science degree in civil engineering. He joined General Telephone Co. of the Northwest the same year as an assistant engineer in the company's Spokane office.

He was transferred in early 1949 to Moscow, Ida., where he held the position of division engineer for two years before returning to Spokane as assistant to the plant superintendent. He advanced through a series of later promotions to the position of building and methods engineer, to which he was named in March, 1955.

New Rates Reported by General of the S.W.

THE FOLLOWING rate increases were granted General Telephone Co. of the Southwest during July, 1956:

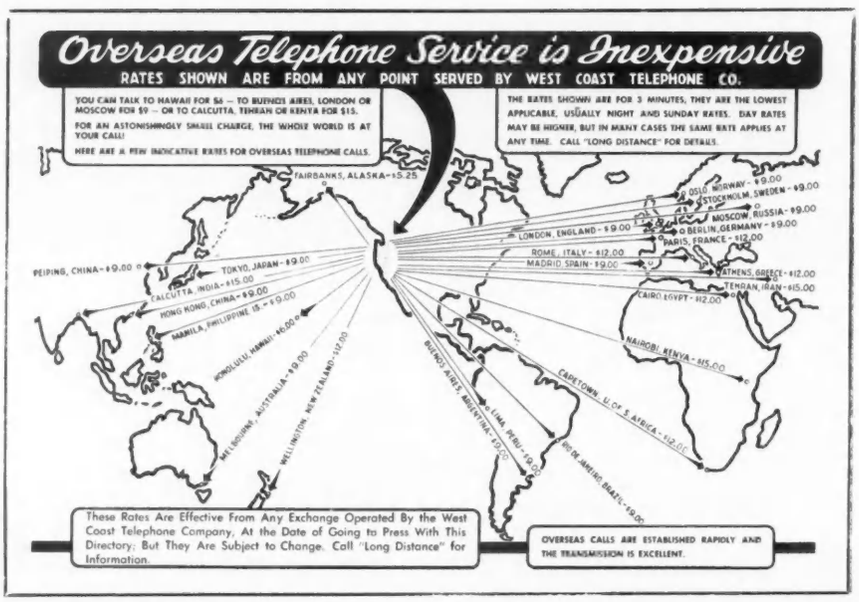
Exchange	Effective	Old Rates	New Rates
Wheeler, Texas	Aug. 6, 1956		
Dial	Bus. - 1-Pty	$9.00	$10.00
423 Stations	2-Pty	7.00	8.00
	Res. - 1-Pty	4.75	5.25
	2-Pty	4.00	4.50
	4-Pty	3.50	4.00
Amherst, Texas	July 26, 1956		
Dial	Bus. - 1-Pty	7.00	8.50
250 Stations	2-Pty	5.75	7.00
	Res. - 1-Pty	4.00	4.50
	2-Pty	3.25	3.50

New Rates Granted Amery (Wis.) Tel. Co.

THE AMERY (Wis.) Telephone Company was authorized by the Wisconsin Public Service Commission to increase its rates by $30,378 yearly.

The firm recently installed dial telephones for 1,460 subscribers and rebuilt other facilities at Amery and Deer Park. A recent loan from the REA of $600,000 enabled the Amery company to modernize its facilities.

The PSC said that because of the investment increase, the rate increase will give the company 3.07% return on its investment.


Overseas Telephone Service is Inexpensive
RATES SHOWN ARE FROM ANY POINT SERVED BY WEST COAST TELEPHONE CO.
YOU CAN TALK TO HAWAII FOR $4 — TO BUENOS AIRES, LONDON OR MOSCOW FOR $9 — OR TO CALCUTTA, TEHRAN OR KENYA FOR $15.
FOR AN ASTONISHINGLY SMALL CHARGE, THE WHOLE WORLD IS AT YOUR CALL!
HERE ARE A FEW INDICATIVE RATES FOR OVERSEAS TELEPHONE CALLS.
THE RATES SHOWN ARE FOR 3 MINUTES, THEY ARE THE LOWEST APPLICABLE, USUALLY NIGHT AND SUNDAY RATES. DAY RATES MAY BE HIGHER, BUT IN MANY CASES THE SAME RATE APPLIES AT ANY TIME. CALL "LONG DISTANCE" FOR DETAILS.
FAIRBANKS, ALASKA-$5.25
OSLO, NORWAY - $9.00
STOCKHOLM, SWEDEN - $9.00
MOSCOW, RUSSIA - $9.00
BERLIN, GERMANY - $9.00
PARIS, FRANCE - $12.00
LONDON, ENGLAND - $9.00
ROME, ITALY - $12.00
MADRID, SPAIN - $9.00
ATHENS, GREECE - $12.00
TEHRAN, IRAN - $15.00
CAIRO, EGYPT - $12.00
PEIPING, CHINA - $9.00
TOKYO, JAPAN - $9.00
CALCUTTA, INDIA - $15.00
HONG KONG, CHINA - $9.00
MANILA, PHILIPPINE IS. - $9.00
HONOLULU, HAWAII - $4.00
MELBOURNE, AUSTRALIA - $9.00
WELLINGTON, NEW ZEALAND - $12.00
NAIROBI, KENYA - $15.00
CAPETOWN, U. OF S. AFRICA - $12.00
BUENOS AIRES, ARGENTINA - $9.00
LIMA, PERU - $9.00
RIO DE JANEIRO, BRAZIL - $9.00
These Rates Are Effective From Any Exchange Operated By the West Coast Telephone Company, At the Date of Going to Press With This Directory. But They Are Subject to Change. Call "Long Distance" for Information.
OVERSEAS CALLS ARE ESTABLISHED RAPIDLY AND THE TRANSMISSION IS EXCELLENT.

THIS INDUCEMENT to use overseas telephone service is now being shown in the telephone directories issued by the West Coast Telephone Co., Everett, Wash. Sales & Directory Supervisor L. A. Gritten, who originated the idea, said —"We believe that despite all the advertisement of overseas service, there are still a great many of our customers, potential users of overseas long distance, who refrain owing to a mistaken idea of its cost. They are unaware of recent reductions of rates and think of a trans-ocean call as something prohibitively expensive. We think these rate maps of world service will help to enlighten many thousands of people in our area who have business and personal connections in other parts of the world."

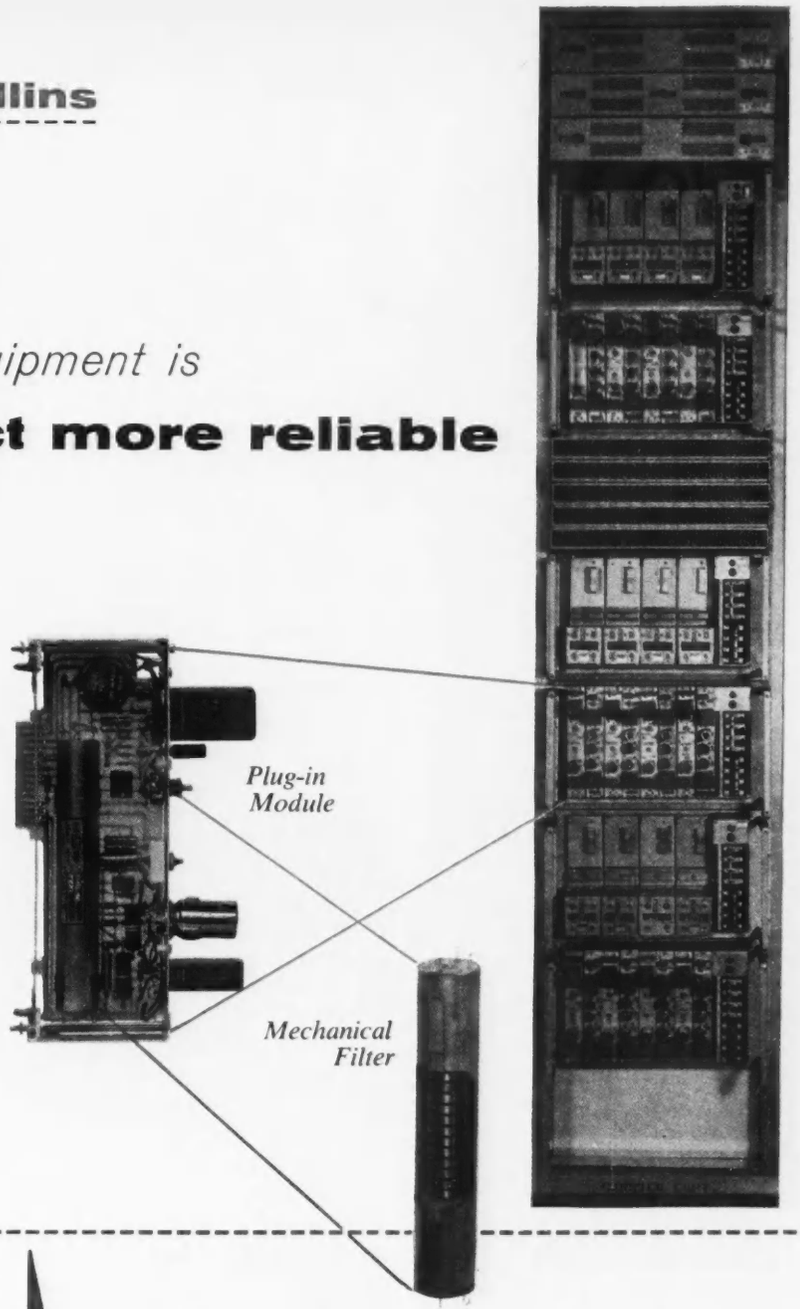
Exclusive with Collins

Mechanically Filtered
carrier equipment is

more compact more reliable

Most carrier equipments use either crystal or high-Q LC filters. To produce LC filters of the selectivity required for high quality performance additional stages of modulation must be provided — an expensive and cumbersome method which subtracts from the reliability of the equipment.

Collins carrier makes use of Mechanical Filters for channel separation. Compact, permanently tuned, and highly selective they greatly increase system reliability, require a minimum of space.



You get benefits like these in **Collins** *carrier, too:*

- Complete compatibility with standard telephone carrier frequency assignments.
- Easy maintenance and uniformity through modular construction and printed circuitry, test point on every module.
- Articulated hinges permit back-to-back panel mounting on equipment rack and complete servicing of any shelf from either side of rack.
- Sensing and automatic switchover for all units common to more than one channel.

Write for new brochure,
"Collins RF and Multiplex Systems for the Telephone Industry."

Collins **CREATIVE LEADER IN COMMUNICATION**

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261 Madison Ave., New York 16 • 1200 18th St. N.W., Washington, D.C. • 4471 N.W. 36th St., Miami 48 • 1318 4th Avenue, Seattle
COLLINS RADIO COMPANY OF CANADA, LTD., 11 Bermondsey Road, Toronto 16, Ontario
COLLINS RADIO COMPANY OF ENGLAND, LTD., 242 London Road, Staines, Middlesex

THIRTY YEARS with Union Telephone Co., and never late for work is record of ETHEL OSBORN, (right) information operator at Owosso, Mich. Mrs. Osborn was the guest of honor at a dinner on the occasion of her retirement. Shown with Mrs. Osborn are (left) CARRIE ANDERSON, traffic supervisor and FLORENCE TRUESDALE, traveling instructor

MRS. EVELYN HIGH (left) engineering department secretary, General Tel. Co., of Indiana, Lafayette, models a new blue handset while CATHY DURGAN, Lafayette PBX Representative, models a nickel-plated instrument of the turn of the century in a bathing suit of vintage to match. Mrs. High and Miss Durgan attended the annual General Telephone Employes Club summer picnic at Oxford, Ind. The employe bathing beauty contest was won by Mrs. High (hence the small trophy in her right hand) and enhanced to some degree by Miss Durgan.

THE TELEPHONE Equipment Division of National Pneumatic Co., Inc., Boston, Mass., has announced the appointment of CARL J. LUEDERS as manager, Telephone Equipment Sales. Mr. Lueders joined the Holtzer-Cabot Motor Division in 1954 as a sales engineer.

GORDON G. HOIT, executive vice president of Stromberg-Carlson, at left and JOHN H. VOSS, vice president — Telephone Division, at ground-breaking ceremony initiating construction of the microwave relay station on Hathaway Hill, a part of the company's experimental microwave link.

Guard your splices right with these

REG. U. S. PAT. OFF.

SCOTCH Electrical Products!

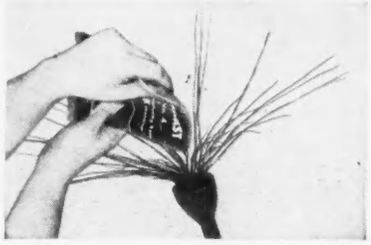
BRAND

Approved for splicing plastic communications cable

"SCOTCH" Brand Plastic Tapes—the *original* plastic tapes. First developed and perfected in our own laboratories. Made to exacting quality standards. Tough, impervious vinyl plastic. Two thicknesses available: 7 mils (No. 33—the standard of all plastic tapes) and 10 mils (No. 22—for extra abrasion resistance).

"SCOTCH" Brand Aluminum Tape — has special adhesive to insure an effective moisture barrier. "SCOTCH" Electrical Tape No. 49 is available in 2 inch by 20 foot rolls.

"SCOTCHFIL" Electrical Insulating Putty —a putty in tape form. Application is clean, rapid, economical. Excellent as a fast build-up for cable splices. Long life, stays firm and flexible, doesn't dry out or become hard and brittle.



"SCOTCHCAST" in "Unipak" Container—casting resin and hardener in plastic double bag. Knead to break inner bag and mix hardener with plastic, then pour. Sets in a few minutes, provides a perfect moisture seal. Makes impervious moisture blocks in cable ends. Especially recommended for splicing lead sheathed cable to plastic sheathed cable.

Above products are approved for use in REA splicing procedures PC-2 and PC-3. Available at your wholesaler. Further information and copies of splicing procedures will be sent free on request. Write Dept. MI-96, Minnesota Mining and Manufacturing Co., St. Paul 6, Minn.

The term "SCOTCH" and the plaid design are registered trademarks of Minnesota Mining and Manufacturing Company, St. Paul 6, Minn. Export Sales Office: 99 Park Avenue, New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

3M

Sound reasons

for stringing Copperweld TRADE MARK non-rusting Line Wire

- Copperweld* Line Wire "talks better" than any other high-strength conductor, due to its thick, molten-welded copper covering.
- Copperweld retains its high transmission efficiency permanently, because it can't rust.
- Copperweld is the only long-span conductor suitable for carrier. When you build with Copperweld, you can convert to carrier circuits, when required, without additional investment in overhead lines.
- It's sound reasoning to use Copperweld, the best engineered wire for voice, signal and carrier circuits.

*Trade Mark

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

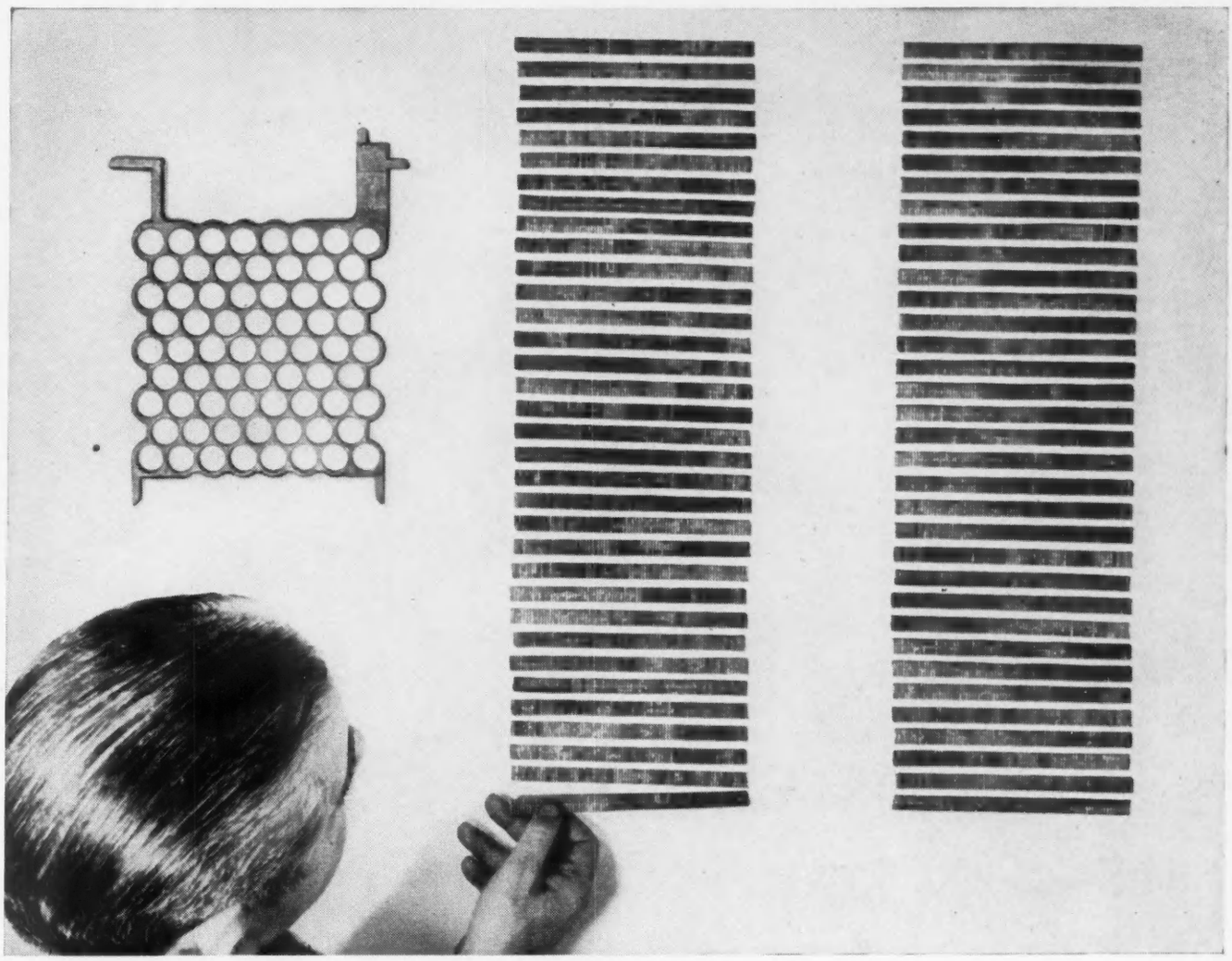
the ideal combination...

COPPERWELD LINE WIRE and GRIP-FLEX INSULATOR TIES

SOLD BY LEADING DISTRIBUTORS

EXIDE-MANCHEX BATTERIES

For telephone systems



Actual photo of the unwound 68 spiral buttons from just one Exide-Manchex positive plate.

Enormous plate area multiplies battery life

TELEPHONE BATTERY. Models available in capacities from 8 to 960 ampere-hours. Write for Bulletin No. 4852.

Here's a mystery unwound. It's photographic evidence of the greater plate area of Exide-Manchex Batteries—one of the major reasons they can give such long life in so wide a variety of applications.

In the picture shown above, the spiral lead buttons from a single Exide-Manchex positive plate are unwound and laid flat on a table beside the empty grid. Look at the enormous actual plate area of the unrolled buttons—over five times as great as the plate size!

Think what this means for long battery life. Each part of the surface of the Exide-Manchex positive plate works easier to produce electricity than it would have to on a smaller area plate. The Exide-Manchex Battery can coast where many another battery is forced to strain. And active material lasts years longer than it otherwise could.

This unique construction feature of Exide-Manchex Batteries is only one of the many reasons for their long life. When you order batteries for floating service applications, or the equipment that requires such batteries, be sure to specify Exide-Manchex. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

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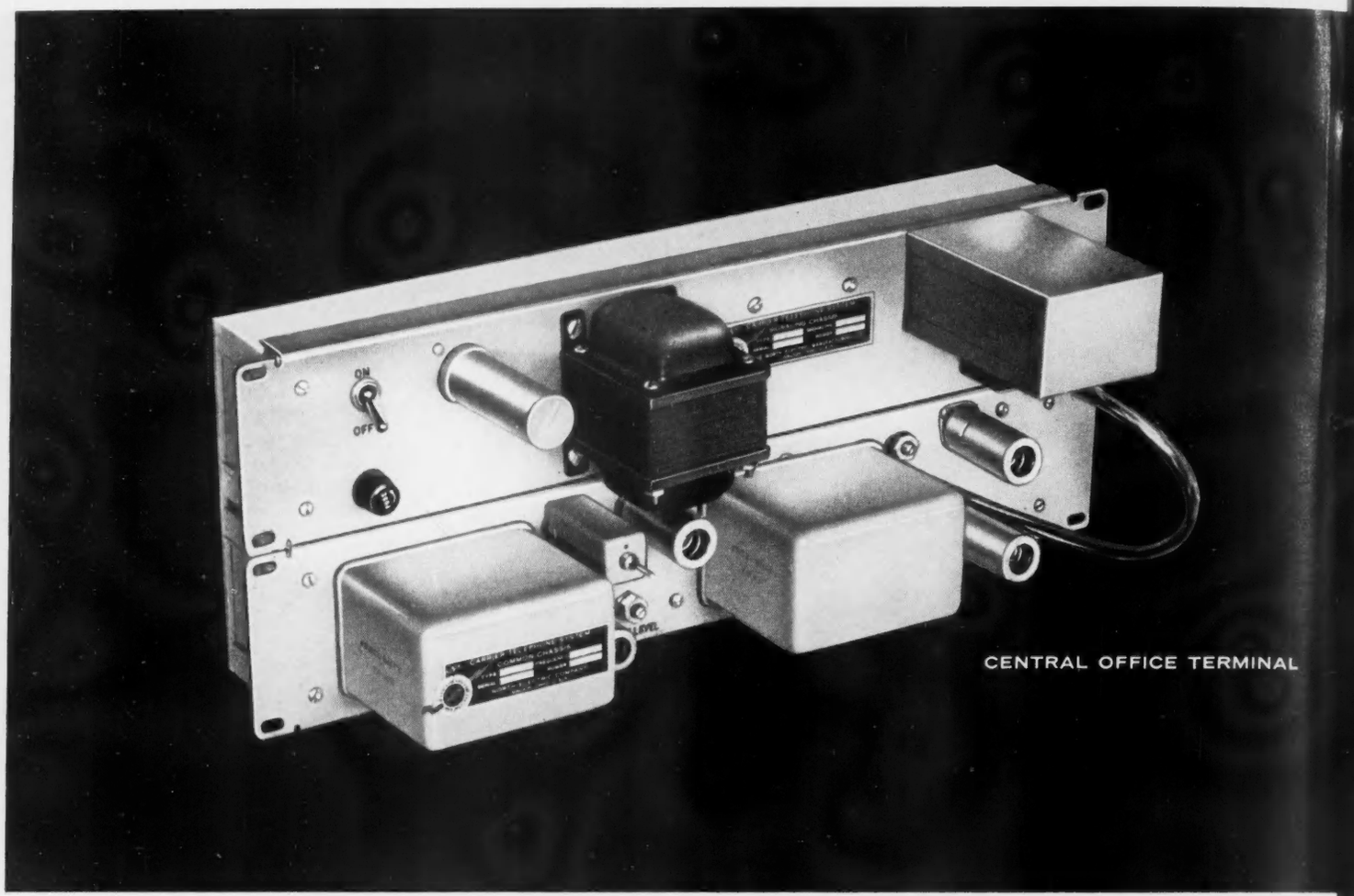

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3. Provide private, two-party, or four-party lines not now available, with resulting improvement in rate earnings!

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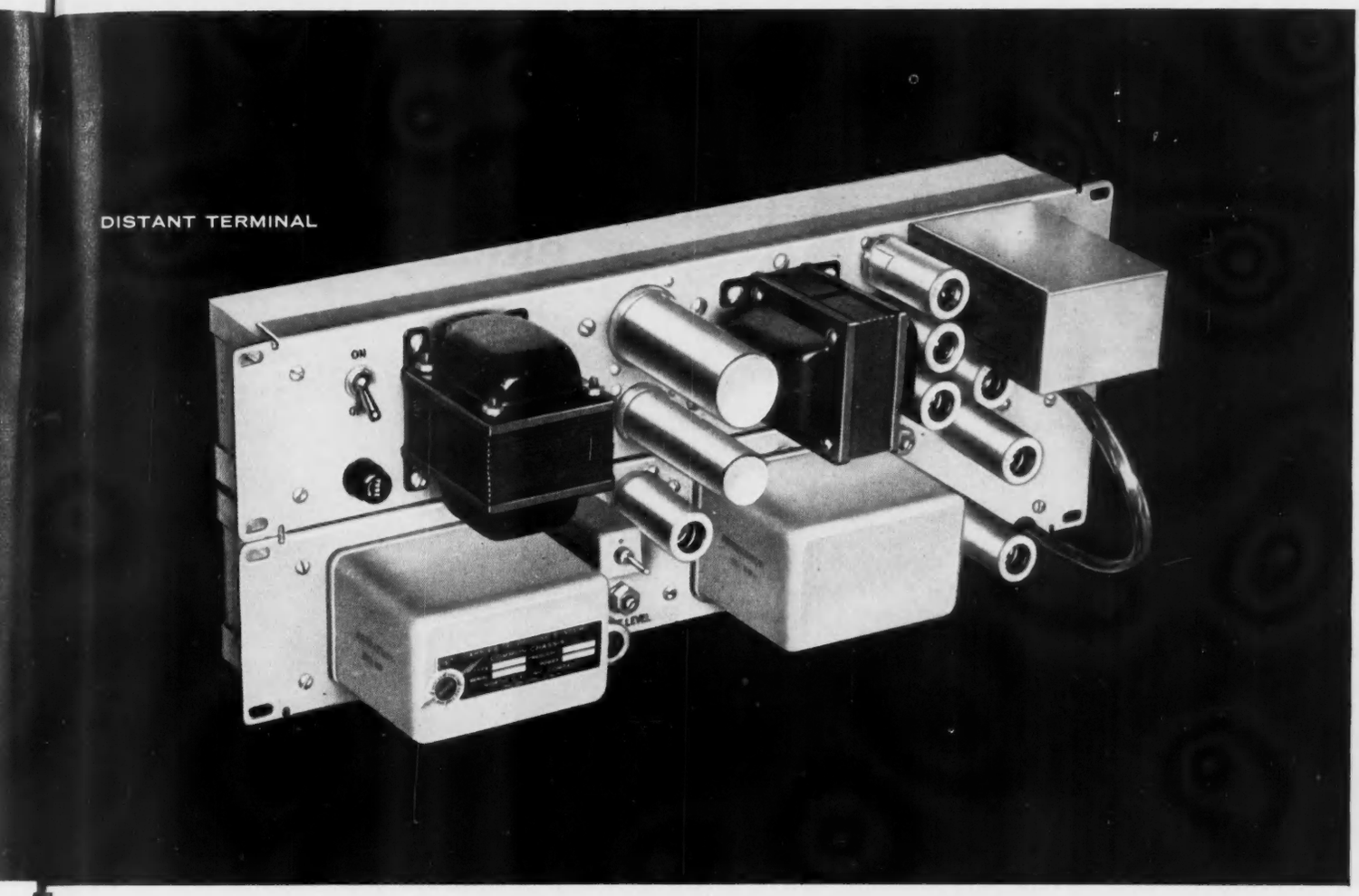

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North Carrier can do all this, and more, for you without the heavy expense of physical line construction!

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NORTH ELECTRIC COMPANY

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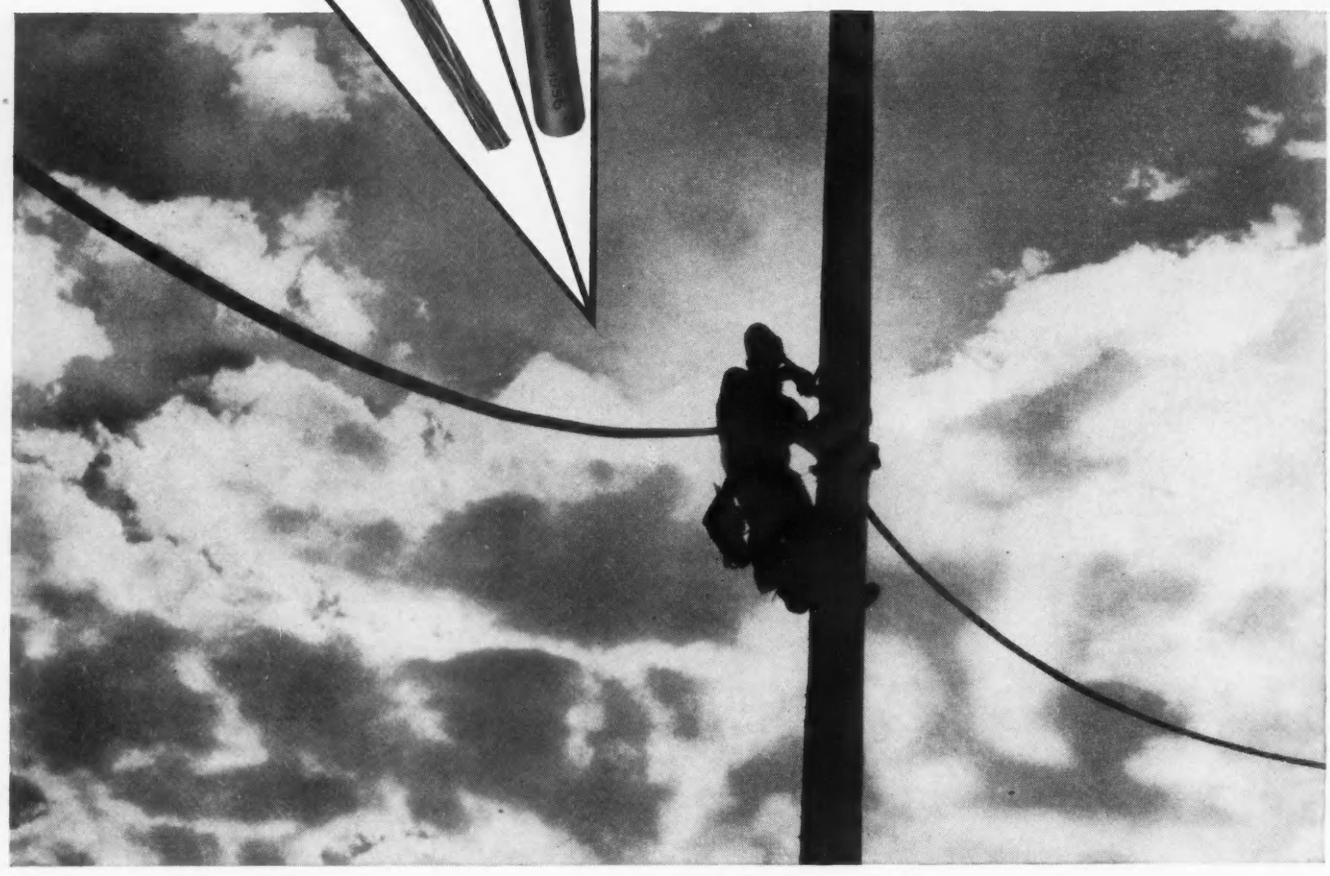
Choose the right *self-supporting* cable for each job



Substantial savings are possible on new construction and cable plant extensions with the use of Ankoseal Self-Supporting Cable because of the elimination of the messenger and associated hardware as well as the reduced man-hours required to string the strand and attach the cable. The lightness and flexibility of the cable will also reduce installation time.

Rural Distribution Wire: *Without shield or jacket, the individual conductors are insulated with polyethylene plus a PVC outer covering made in three, six, eleven and sixteen pairs. The fully color coded pairs are cabled around a polyethylene insulated, high strength, 109 galvanized steel support wire. Suitable for fast, low cost construction to provide temporary service or cable relief.*

Type 775-P-SS: *This is the standard Ankoseal self-supporting cable, fully shielded and PVC jacketed for permanent installation. Made in six, eleven, sixteen and twenty-six pairs. Shielding protects against induced noise. The PVC jacket provides uniform transmission characteristics under all weather conditions. Elimination of the messenger speeds installation and reduces costs.*

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Telephone Engineer

EDITORIAL

Telephone Engineer

"Emphasis On Management"

A FEW DAYS ago *William F. Miller*, secretary-treasurer of the Iowa Independent Telephone Association, stated a fact that has been a long-time pet of this department.

"The key to survival, or success, or failure, is management," Mr. Miller said. "Telephone companies that do not have good management are, in effect, taking advantage of the public . . . We are not being fair to ourselves or our customers if we settle for anything less than good management . . . "

We believe such observations deserve repeating. During the many years we have viewed the telephone industry as a whole, we have noted that a sharp contrast exists in the degree of success achieved by companies of the same relative size and income potential.

Some move ahead, provide good service to subscribers and operate profitably. Other companies are in a constant state of turmoil — servicewise, customerwise and profitwise.

In any analysis of what makes one company tick smoothly while another flounders helplessly, one fact stands out: *Calibre of management is the most decisive factor in influencing a company's success or failure.*

This fact is highlighted in the Final Report on Small Business prepared by the Select Committee on Small Business, House of Representatives, 82nd Congress.

This report states: *"Most of the authorities on the problems of small business believe that inefficient management is the most important cause of business mortalities. . . . The day of operating a business by the trial and error method is rapidly giving way to modern scientific ideas. The period in which an individual can make a success of a business venture by relying solely on his native talent is rapidly fading from the scene . . . . "*

We agree with those conclusions. We will grant that management's job is today more difficult than it has been at any time in the past. New communication developments that must be taken into account in both short and long-range planning are appearing at a fast rate. Changes are going on in the industry and today's manager must be prepared to make adjustments more quickly.

It seems to us that today's manager, in order to strengthen his company's chance of survival, must be aware of and adopt modern management practices which will enable him to better chart his company's course.

We well know that many managers are doing just that. That fact comes out of correspondence which tells us that more managers are critical of themselves and their methods. We know of many managers who continually appraise their activities to make sure they add up to a successful business operation.

This self-critical attitude is a healthy sign.

The records prove that the company with a management which does not indulge in close examination of its methods coasts blithely down the road to trouble. And on the other hand the records also prove that real progress has been made by companies whose managements were ready to admit they were something less than perfect and then set about re-assessing their policies and methods with a view to finding out where they were falling down and what they could do to remedy the situation.

Such records prove beyond question that the industry's progress has been and will continue to be lead by those who have been self-critical of their methods and willing to adopt new and better methods.

We know Bill Miller realized that truth when he said *"The key to survival, or success or failure in this whole fast moving era is management . . . "*

That statement as we said before bears repeating. We believe in it. The management of a successful telephone company believes in it. And the managements of unsuccessful companies *need to believe in it.*

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• SOCIAL AGENCIES • AND OTHER ORGANIZATIONS OF MEDIUM SIZE

For your subscribers who need the efficiency and convenience of a PBX with intercom dialing, *our new 6K-1 fingertip system* is the answer.

For the first time you can offer your subscribers intercom dialing with the *Stromberg-Carlson exclusive feature of up to 15 stations.* The dial selector unit is mounted separately in a small, compact cabinet. In a system with intercom dialing for up to 10 'phones, the dial selector is mounted in the relay box.

Additional new features with strong subscriber-appeal include tie-lines to connect one 6K-1 system with another one, such as at a branch office; distinctive lamp signals; and an exclusion feature. The beauty of the gray 6K-1 telephones is another powerful selling point, for these instruments harmonize perfectly with modern office décor.

Our new fingertip PBX opens great new vistas of increased revenue and big profits. For full details, sales aids and quick delivery, contact your Stromberg-Carlson representative now.

STROMBERG-CARLSON COMPANY

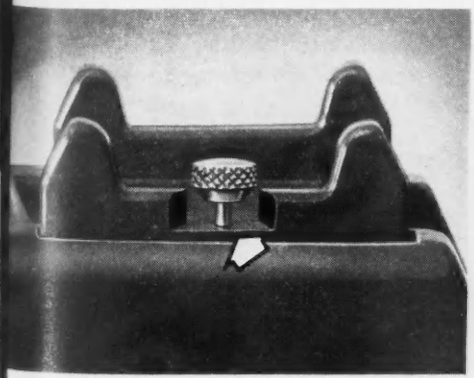
A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

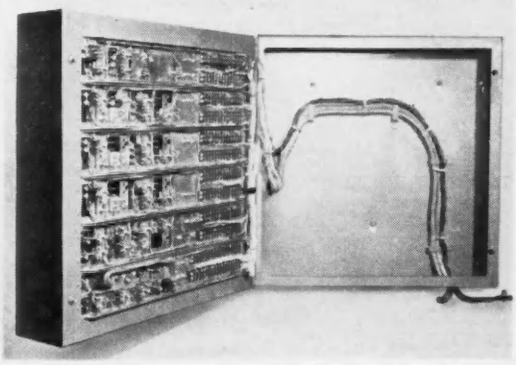
Make or receive outside calls on any 'phone in the system. Each instrument can have up to 4 trunks plus dial intercom—selected by keys.

Hold calls and transfer them without cutting off the outside party. This feature means increased efficiency and improved customer relations for the user.

Lamp signals show status of line. Through selective signal flashing on intercom, called station receives flashing lamp; all others glow steadily to indicate line in use.

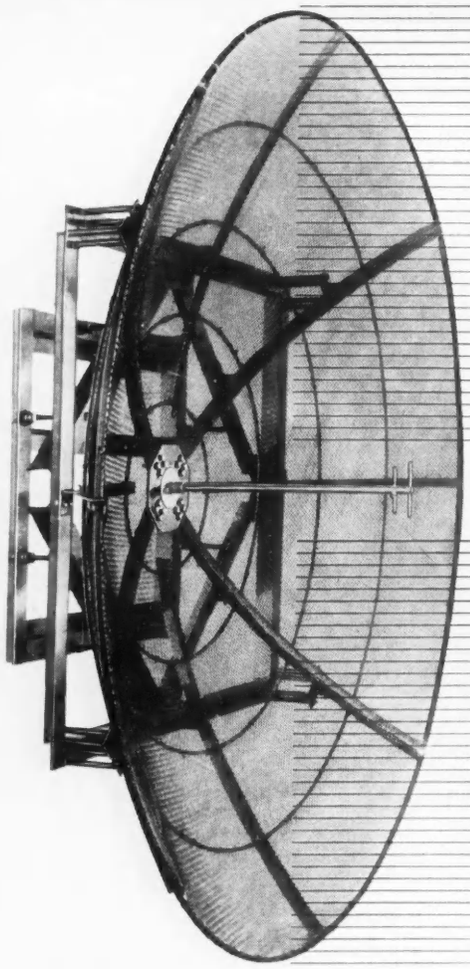


Manual exclusion feature gives user complete privacy. When button is lifted, no one in the system can hear conversation. Several stations in system may have this feature.



Relay box swings open easily, permits quick access for inspection and maintenance. Dial selector is mounted here in system with up to 10 stations.

Tie-lines connect one system with another, even when the systems are at opposite ends of the city. Ideal for subscribers with more than one location.



For MICROWAVE that stays right on the beam . . .

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More and more telephone companies look to Automatic Electric for Lenkurt Radio Equipment, engineered specifically for telephone application. Lenkurt's Type 72C equipment has a capacity of up to 360 voice channels in the 900-megacycle band. In this frequency range, longer hops are possible—over any terrain, in any kind of weather. A 72C Radio System is especially desirable for use in spanning bodies of water, since fading due to reflections can be kept at a minimum.

And now that Automatic Electric and Lenkurt offer "package plan" engineering, it's easier than ever for you to own, maintain, and use carrier and radio equipment. Our communications specialists provide complete "beginning-to-end" service, including *Specific Recommendations . . . Detailed Specifications . . . Finest Equipment . . . Complete Construction . . . Expert Installation . . . Staff Training . . . Follow-Up Counsel.* For more information, *write or call* Automatic Electric Sales Corporation, 1033 West Van Buren Street, Chicago 7, Illinois (HAymarket 1-4300). *In Canada:* Automatic Electric Sales (Canada) Ltd., Toronto. *Offices in principal cities.*

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Originators of the dial telephone • Pioneers in automatic control

GENERAL SYSTEM INDEPENDENT

Latest addition to General Telephone fleet is new Jr. Semi shown above.

WELLS CARGO Jr. Semi's Help Cut Inventories For General Telephone

Ever since Alexander Graham Bell started the whole thing, telephone companies have had an inventory problem. Storeroom men daily face the task of moving a surplus "from where it is to where it's needed." Naturally, telephone executives are constantly on the alert for better methods of inventory control.

The problem is complicated by the fact that a telephone company is a public utility. When service is knocked out by flood or tornado, linemen and cable splicers use up heaps of materials. And they need these emergency supplies in a hurry.

General Telephone Company of Indiana employs two WELLS CARGO units and a pickup truck to hold inventories in line. With assured deliveries guaranteed by two mobile field warehouses, storeroom men need no longer carry excessive inventories as protection against disaster.

WELLS CARGO Jr. Semi's benefit General Telephone in several other ways. Hauling costs between divisions are lower; outlying exchanges get quicker delivery service; and new construction proceeds faster when a mobile warehouse is parked at the work location.

It is interesting to note that two WELLS CARGO Jr. Semi's cost less than one cable truck. With reasonable care, a Jr. Semi will outlast a cable truck three times over. And any Jeep, pickup truck or station wagon fitted with standard ball hitch equipment easily tows a fully loaded WELLS CARGO Jr. Semi.

For information on the versatile WELLS CARGO Jr. Semi, write:

Wells Cargo, Division of Praire Schooner, Inc., Elkart, Indiana

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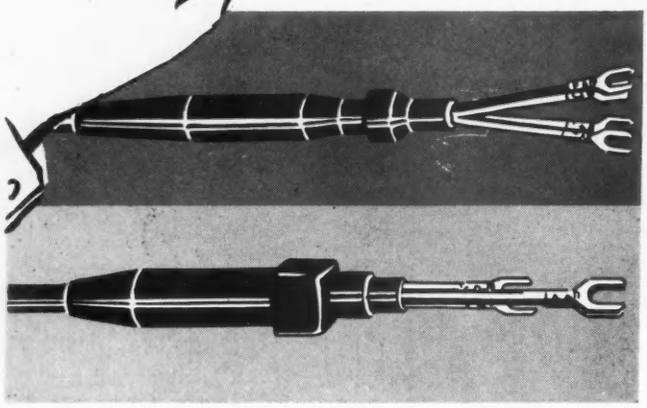

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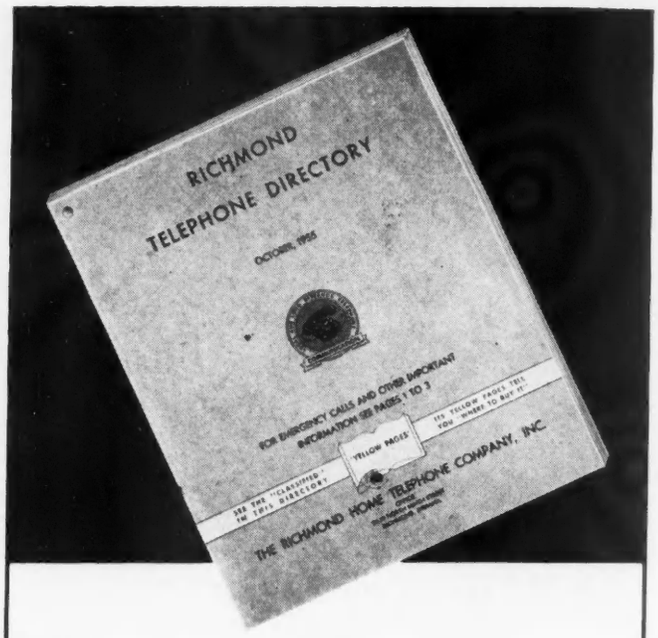

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The Richmond Home Telephone Company, Inc., Indiana
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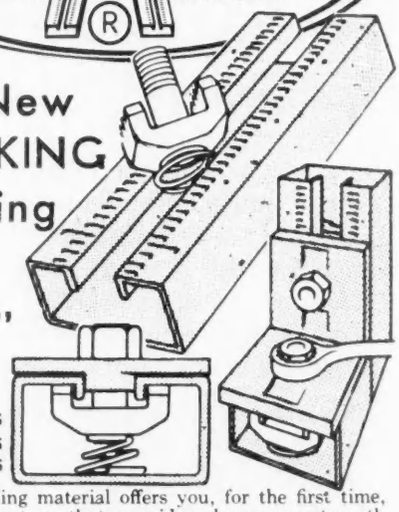

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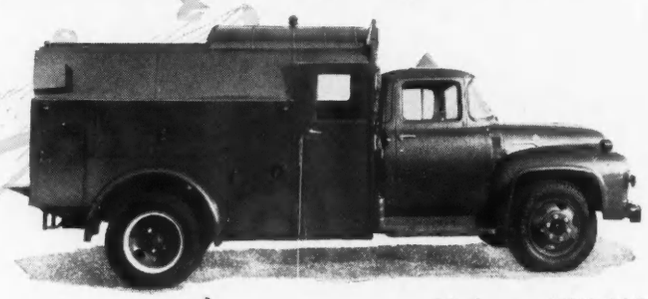
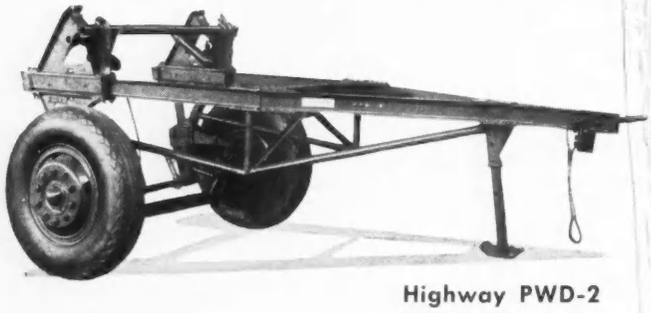


Highway MW-128
Utility Truck Body

Highway heavy-duty HC Earth-Boring Machine

HIGHWAY



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Highway IU-76 Installer's Unit

Highway PWD-2 Cable Reel Trailer is designed for quick, easy loading and transport of heavy cable reels up to 48" wide. Like other Highway utility trailers, it handles its load safely and steadily, even at high speeds on the road.

Highway MW-128 Utility Truck Body carries a full crew to the job with all necessary materials and equipment, on a standard truck chassis. Highway builds a full line of utility bodies for general and special service.

Highway IU-76 Installer's Unit is a specialized body for mounting on a half-ton truck. Scientifically arranged equipment compartments and tool carriers at sides and rear put all needed tools and materials within arm's reach.

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SALES AND SERVICE IN PRINCIPAL CITIES

Planning plant practices

By T. DEWITT TALMAGE*

BECAUSE OF THE QUESTIONS and problems created by industry-wide trends, the sources of reports and other information on the latest engineering and operating practices are of growing importance to all telephone companies. In this article Mr. Talmage describes some easy methods of keeping informed.

DURING the past nearly 30,000 days since the telephone was invented, an immense amount of experience in providing reasonably-priced telephone service to the public has accumulated. Much of this valuable experience is recorded. A helpful amount of this record has been published and is available to anyone who has the desire to locate, study, and profit from it.

The need for certain types of information grows more urgent, if not critical, as telephone plant facilities are expanded and become more highly developed, as problems of co-ordination increase in complexity, if not in number, as service standards are revised upward, as telephone switching systems perform more functions and become more refined, as increasing economic pressures dictate the mechanization and streamlining of business techniques, and as human relations demand more attention.

Because of the questions and problems created by these industry-wide trends, the sources of reports and other information on the latest engineering and operating practices are of growing importance to each and every company striving to keep abreast of the times. Some easy ways of keeping informed of these developments will be outlined in this article.

If these reports — experiences in capsule form — are properly evaluated and applied, they will do yeoman service in smoothing out some otherwise awkward telephone problems today facing both newcomers and old-timers alike.

Practical, commonly-used ways of advantageously applying the results of these studies of the experiences of others are as guideposts in establishing programs of action and as check points in weighing company performance.

There is a pungent epigram that goes: "No two Irishmen are alike — and both of them are glad of it!" Cases akin to this situation are encountered when making comparisons of methods and results between different telephone companies and occasionally even between units making up a single telephone organization.

What causes these differences?

Such obviously influencing elements as geographical location and climatical differences, capital structure and tax variations, peculiarities in customers' habits and preferences, company policy dissimilarities, non-uniformity of state utility regulatory practices, and other factors difficult to standardize, to a certain extent explain the diversity in overall charac-

*Mr. Talmage is educational mgr., Kellogg Swbd. & Supply Co., Chicago.

teristics and results. Still, in other respects, it seems there are as many different ways of conducting the business of furnishing telephone service as there are people that operate and manage the companies.

People being what they are, it is a safe assumption that this condition will continue to prevail for some time yet to come.

It may be expedient as well as profitable, therefore, to learn to live with this situation but not necessarily at the expense of being overly complacent with it nor, where improvement possibilities are discernible, discouraged to the point of feeling that "nothing can be done about it."

Numerous Answers Available

IT WAS probably with about this state of affairs in mind that a telephone man recently repeated the often-made observation that there are nearly as many solutions to a problem as there are experts that work on it. Inasmuch as there are just as many experts in this world as there are kinds of man, this reasoning will likely be right about one-half of the time.

This being the case, therefore, we should normally expect that approximately one-half of the explanations and discussions of experiences at trade association meetings and in industry publications will be of timely concern to each interested listener or reader.

Putting it another way, for example, about one-half of each article in this magazine — including this one — should apply in some degree to present-day problems of each individual having average incentive to read it.

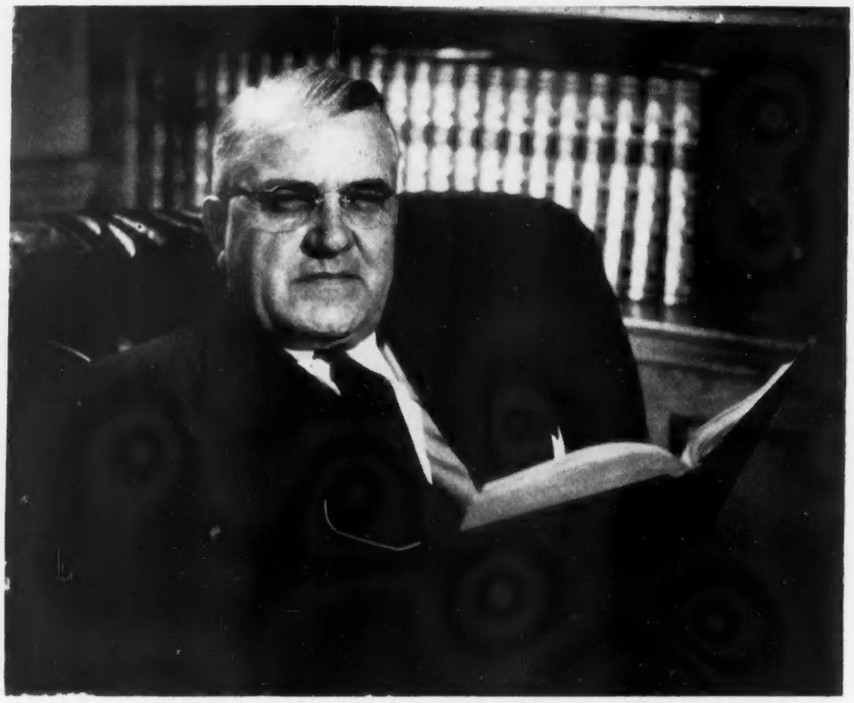
Fortunately, the remaining half of the information is not always a complete loss as will be explained later.

Now this may be an over-simplification of a complex subject, but regardless of the exact percentages that may be found to exist in specific cases, readers determined to profit from immediately applicable portions must resolutely read each and every page.

This situation is not unlike that allegedly encountered in a restaurant as the following incident illustrates:

Waitress: "This is your fifth cup, sir. You must like coffee."

Lineman: "I sure do. That's why I'm willing to drink all this water to get a little of it."



TOMORROW'S PROBLEMS may be, and usually are, different from today's pressing matters. Often a worker climbs over one obstacle just to find another. Therefore, the practice of reading with the thought of *storing away ideas for future use* is of growing importance to every employe striving to keep up with the industry.

Check Your Memory

ACTUALLY, serious readers can prove to their own satisfaction that the time spent reading their favorite trade magazine is not 50 per cent wasted just because they cannot use all of the information at the moment.

Tomorrow's problems may be, and usually are, different from today's pressing matters. To this extent telephone workers are like mountain climbers. They climb over one obstacle just to find another staring them in the face.

Therefore, reading the telephone industry's publications with the thought of storing away ideas for future use is a logical approach. This plan of action is one of the business world's interpretations of the policy often expressed as "In times of peace, prepare for war."

The full meaning of this intriguing condition can be directly verified and better appreciated by each reader by referring back to previously read material of a few years ago, and, while rereading, noting the points that are especially applicable today that were considered of minor or no interest to you at that time. Revelations from such test check-ups will probably include a more vivid realization of the limitations of the human memory — especially when we read in a superficial manner.

Can this situation be corrected?

Simple Filing Systems

TO IMPROVE at least a part of this condition, a workable solution used by many has been to establish and regularly use a straightforward system of identifying, classifying, and filing basic technical and business information pertinent to their work — present and future.

Such an arrangement provides a valuable working tool that, habitually used and kept up-to-date, grows more valuable with each passing month because it allows one to conveniently squeeze out the very last bit of usefulness from all types of reference materials, including catalogs of equipment and supplies.

One of the secrets of success of such a system is the careful choice of a simple but complete indexing and filing plan that will require only a minimum of time to keep it up-to-date and yet will permit specific subjects to be quickly located when needed on short notice.

How is this done?

For many, the use of the publisher's annual or semi-annual index, as the case may be, will be the starting point for the simplest system. For

others requiring a more detailed plan, such indexes will provide a pattern for an expanded treatment.

Where speed of use is an important consideration, tables of contents of individual issues or the indexes mentioned previously may be combined and a cumulative-type index prepared that will concentrate in one place all references on any one subject. Such a consolidated index should be found advantageous by those whose time is limited and require rapid results.

The indexing and filing of other classes of information — catalogs, for example — are generally found to be most convenient if done alphabetically by name of manufacturer or distributor rather than by a breakdown into separate product groupings.[1]

A very helpful master index to rely upon in this type of setup is a detailed listing of product information referenced to supply sources. Such an indispensable time-saver is included as one of the many useful sections of the 21st edition of *Telephone Engineer's* "1956 Catalog-Directory of the Telephone Industry Suppliers" on pages 185 to 306, inclusive. In this comprehensive tabulation of nearly 700 separate entries of products and services will be found the key for identifying each item commonly used in the telephone business cross-indexed to the catalog of the supplier that can furnish it.

Engineering Index

FOR THOSE whose work includes the technical phases of the telephone industry, there is available still another time-and money-saving service that is worth considering. This is the use of the weekly engineering index service furnished by the nonprofit organization of the same name.

Essentially, the engineering index service is a concise guide to engineering information contained in approximately 1,200 technical magazines, technical society transactions, government bulletins, research reports, etc., published throughout the world. Important articles in current engineering literature are abstracted and classified by a staff of qualified editors, and published on standard library-sized cards (3″x5″), thus providing a ready-reference file containing:

(1) Subject heading classification.
(2) Title of article and author.
(3) Name and date of publication.
(4) Brief summary of article.

A subscription to the telephone and telegraph engineering section of the complete index-card service provides an up-to-date record of published material on the design, manufacture, operation, maintenance and repair of telephone and telegraph equipment; telephone plants, exchanges and lines; radio telephone and telegraph for fixed or mobile use.

All publications indexed are permanently filed in the Engineering Societies Library, 29 West 39th Street, New York 18, N. Y., which will supply photoprints, microfilm, or translations of the complete text of any reference supplied by the engineering index.

Have you ever wondered how some people accomplish so much in a day's time?

One of the explanations is the regular use of such typical systematic methods and short-cuts as those just described that assist in providing the background to understand and the stimulant to think out solutions through objective analysis.[2] As has been so frequently stated: the next best thing to having the answers on the tip of your tongue, is to know where to find the information in time to use it effectively.

To successfully fill any job demands, among other things, the ability to organize time and effort. The village blacksmith boiled it down to the classical statement: "*A minute of planning is worth an hour of hammering.*"

Approaching even relatively small but important problems, like those examined so far, in an orderly fashion furnishes the practice and experience so essential to developing correct work habits that result in one automatically tackling the bigger jobs in the same methodical manner.

Typical examples of the current need for such thorough studies and detailed planning are those involved in the several major steps of converting telephone systems from manual to dial service such as financial feasibility studies, coordinated rehabilitation and new construction plans, central office building rearrangements and modifications, designing and engineering new central office buildings, preparing dial pre-cutover schedule and check list, assembling and organizing rate-case data, establishing and carrying out commercial and plant practices required to operate modern dial telephone exchanges and last, but not least, initiating an employe training program.

Reading Rapidly

TO REAP the harvest from the investment in such an indexed storehouse of information, the next

A SYSTEM of identifying, classifying and filing basic technical and business information provides a valuable working tool that will grow more valuable with each passing month.

[1] "*Improved Filing System for Catalogs,*" *published in Consulting Engineer, pp. 68-70, inclusive, February,* 1956.

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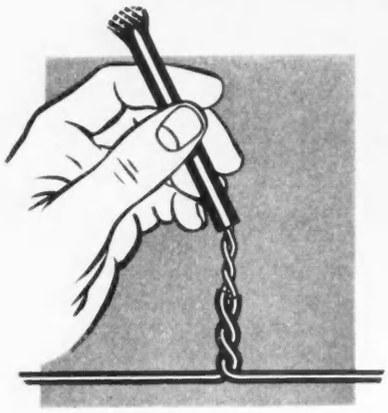

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TO SUCCESSFULLY fill any job demands, among other things, the ability to organize time and effort. Approaching even relatively small but important problems, in an orderly fashion furnishes the practice and experience essential to developing correct work habits needed by such skilled jobs as cable splicing.

step is to schedule adequate time to use it. Very often the reading of such reference material must be squeezed in between other pressing tasks and. therefore, must be done rapidly if it is to be done at all.[3] This is not an unusual condition today when the average telephone plant man is busier than a one-armed xylophone player two bars behind in his music, and trying to catch up without missing a note.

How fast should you be able to read?

It all depends, say the experts. Fast reading, just for the sake of speed, is like running through a large factory during an inspection trip, glancing from left to right with the final result a big blur. Your speed of reading is determined by the flow of ideas from the printed page, and their complexity. An experienced reader, many think, should be able to read 300 words a minute from material of average idea difficulty and which the reader has average incentive to read. On this basis, the reading time of this article should be twelve minutes.

How can you become a better reader?

For those interested in improving their reading, a review is recommended of Dr. Paul Witty's practical book listed in the appendix. For others who do not feel they can find time to study[4] even a few selected chapters of Dr. Witty's suggestions, a briefer, less-expensive pamphlet is available from Stanford University Press, Stanford, California, written by C. G. Wrenn and Luella Cole, entitled, "Reading Rapidly and Well." This 16-page booklet will be found helpful for either group instruction or for individual study.—*To be concluded in the next issue.*

---

[2]"*The Art of Problem Solving — How to Improve Your Methods*," *by Edward Hodnett*, 202 *pp., Harper & Brothers*, 1955.

[3]"*Would You Read a Little Faster?*" *by R. G. Ranney, Chief of Special Instruction, Signal Corps Engineering Laboratories, Dun's Review, Vol.* 61, *No.* 2299, *pp.* 30, 31, 88, *and* 90-97, *March*, 1953.

[4]"*How to Gain an Extra Hour Every Day*," *by Ray Josephs*, 192 *pp. E. P. Dutton, N. Y., N. Y.*, 1955.

EDITOR'S NOTE

In the concluding section of his article, Mr. Talmage will discuss: — (a) "Knowing Fundamentals;" (b) "Training Pays Off;" (c) "Versatile Workers Needed;" (d) "Training Testmen;" and (e) "Pamphlets Available."

"Useful Ideas"

In Modern Construction Tools

By JOHN S. REED

GOOD tools have proved their value in telephone construction work time and again. This is even more true today with high labor costs prevalent in telephone construction work. Many tools have been improved for better service and ease of operation and new tools have been developed to meet specific needs of telephone construction crews, all in the interest of better telephone service.

This article discusses a number of useful tools of new or improved varieties.

Personal Tools for Workmen — Climbing Equipment

PERSONAL tools are considered to be those worn by construction men or used almost constantly by them. Among these are body belts and safety straps, climbers, pliers, screw drivers, and the like. The body belt and associated safety strap is an item of personal equipment much used by telephone company linemen. The body belt and safety strap are worn constantly while working atop the pole and often on the ground if frequent work on poles is necessary.

Besides providing a support for the safety strap, the body belt carries the lineman's tools distributed in loops and fittings on the belt. This belt has two large "D" shaped rings for engaging the snap hooks of the safety strap to support the lineman while he is working atop a pole. The "D" rings and buckle are designed to provide adequate strength. Typical linemen's body belts used in telephone construction crews are illustrated in *Figures* 1 to 3. These belts are strong, durable, well constructed, light weight.

FIG. 1:—Body belt with contoured cushion, semi-floating feature, and shifting "D" rings for additional comfort to the wearer.

These belts incorporate special features of interest to linemen. For example, the body belt shown in *Figure* 1 has a 5½ inch cushion of the contour type which tapers from the center of the back to the tongue and buckle ends, which are narrower so that they will not interfere with a man when he is leaning over or extending himself abnormally in his work.

The belt is a semi-floating type with

FIG. 2:—"Cushion deluxe" tool belt with rolled edge feature providing a cushion effect for greater working comfort for the wearer, and a floating arrangement permitting wider range of body movements without binding tools or clothing.

FIG. 3:—Belt with back support and two strap arrangement, enabling the wearer to be up higher on work and farther out on pole without hazard of falling out of saddle and permitting wearing belt in a low comfortable position.

FIG. 4:—Nylon safety strap designed for high strength, impregnated with neoprene for resistance to effect of pole preservatives, cleaning agents, and climatic conditions, and provided with a red center to indicate when strap should be replaced.

the shifting "D" ring feature. This semi-floating feature means that the tool saddle which is secured to the belt has a three point suspension at the buckle end, the center of the tool saddle, and the tongue end. By securing at the three points mentioned, the tool loops will not close around the tools when the belt is worn.

In the shifting "D" ring arrangement, the "D" rings move from one side to the other in approximately a four inch shift so that the rings will not rest on the man's hip bones when he is working. This is claimed to provide additional comfort to the wearer.

The floating tool belt #1058 illustrated in *Figure* 2 is a strong, durable, and flexible belt made from the best grade of leather. It has a rolled edge feature providing a cushion effect affording greater working comfort to the wearer. The floating feature permits a wider range of body movement under all working conditions without binding tools or clothing. The tool loop strap is formed into five loops with two rivets which strengthen each loop to prevent twisting and sagging.

Figure 3 shows an unusual type of belt designed as the "Bak-Saver" belt. This belt is designed to reduce back strain and it is claimed to eliminate the hazard of falling out of the saddle and permits linemen to be higher on their work. Because of this he can work farther out from the pole with greater comfort and freedom. The strong and light weight belt combines the protection of a safety belt with the comfort of a back support. This type of belt permits wearing it in a low, comfortable position, firmly supporting the tool weight, and holding tool belt in proper position.

The safety strap is literally a life saver for the man working on the pole. Should the strap fail, the man would have nothing to hold him on the pole and he would most certainly fall. For this reason, only the best quality of safety straps should be purchased.

The nylon safety strap illustrated in *Figure* 4 is probably the strongest that has ever been produced for use by linemen with the additional feature of long life. The nylon strap resists climatic conditions and will not rot. For an added safety factor, this strap has a red center to show when the strap wears to a certain point.

This red center shows through and

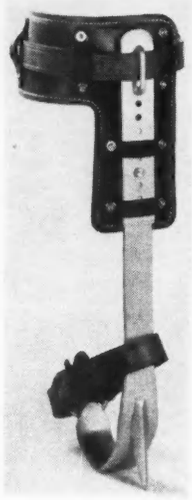

FIG. 5: — Linemen's climbers of adjustable type with pads and straps.

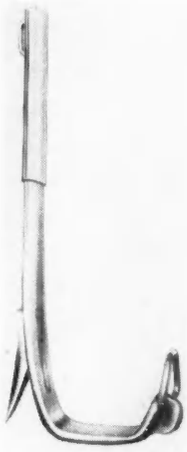

FIG. 6:— Climber with adjustable sleeve, non-shifting triangular ring and replaceable gaff.

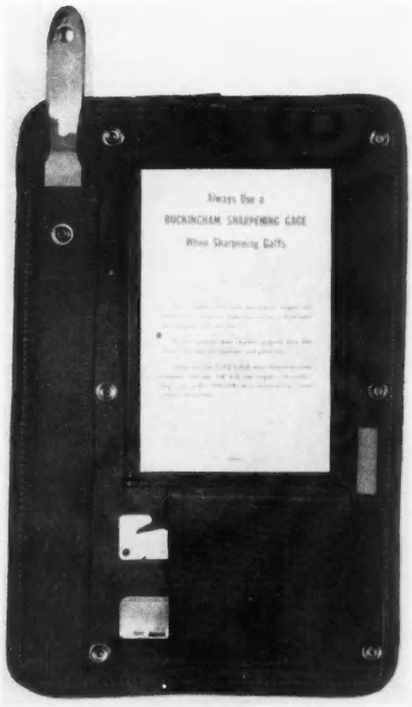

FIG. 7:—Gaff sharpening kit containing safety hand file, profile type gaff gauge, angle type gaff gauge, and hone for removing scratches on surfaces of gaff contained in special pouch.

warns the worker that the strap should be replaced with a new one immediately. High grade leather straps, of course, are satisfactory and are preferred by many linemen since good care, proper lubrication and cleaning with saddle soap will preserve the strength of the strap and assure its long life.

It is of interest to note the strength of the various kinds of safety straps of two inch width. With ¼ inch buckle holes and 5 inch centers, the strength of a harness leather strap is 1500 pounds, of a fabric strap, 2350 pounds, and a nylon strap of the same width, 5900 pounds.

For maintaining fabric types of straps a special dressing should be used. Such a dressing is applied lightly and allowed to dry into the fabric when the outer coating shows wear due to contact with the poles. Only a dressing specified by the manufacturer for use with the specific type of strap should be employed, as varnishes or other types of dressings may injure the material.

Next to the body belt and safety strap, linemen's climbers are the most important tools. Well fitting climbers with properly shaped and sharpened gaffs assure climbing comfort and safety for the lineman. Types of lineman's climbers are illustrated in *Figures* 5 and 6.

Climbers are available in standard types and adjustable types. Adjustable climbers have an advantage in that they provide a variety of sizes and enable a minimum stock to be set up with fewer climbers.

However, a few linemen do prefer standard non-adjustable climbers since they can be bent to fit the legs and provide comfort especially on long jobs atop a pole. Nevertheless, some types of adjustable climbers may be bent to shape if desired, provided that they are first adjusted to properly fit the lineman's legs.

Adjustable climbers are also available with replaceable or fixed gaffs as desired, with the advantage that climbers need not be discarded because of short gaffs, but can have the gaffs replaced in the field or the company repair shop. This enables the lineman to retain his favorite pair of climbers and he does not have to break in another pair to replace the ones with gaffs that were too short for safe climbing.

It is to be noted that manufacturers provide a regaffing service for companies who wish to make use of their old climbers. This regaffing service extends the life of these tools and saves the cost of new climbers.

Since sharp gaffs are very important for safe climbing, it is desirable to provide linemen with a sharpening kit such as that shown in *Figure* 7. A typical use of a gaff gauge is illustrated in *Figure* 8. Gaff gauges enable climbers spurs to be properly shaped and sharpened so that they will not cut out. Many cut outs have been traced to an improperly sharpened gaff.

Whether linemen should sharpen their own climbers or whether they should have this work done in the company repair shop depends upon company policy. Many companies, particularly the larger ones, prefer to have the climbers sharpened in their repair shops by skilled tool repairmen in accordance with standard specifications. However, it is also a fact that conscientious linemen know that their safety on the pole depends on proper sharpening of their linemen climber spurs, and, given the proper tools, they will do a very good job of maintaining their climbers. The gaff sharpening kit illustrated in *Figure* 7 would be very helpful.

To protect climbers when they are not in use, it is a good idea to apply gaff guards such as those illustrated in *Figure* 9. The gaff guards will prevent damage to the sharp edges of the spur and prolong their useful life.

Useful Plier Tools

LINEMEN make much use of a number of plier tools, screw drivers, and the like. Types of tools such as diagonal pliers, lineman pliers, and lag wrenches, have long been standard and linemen are well acquainted with them. They will not be covered in this discussion.

However, many linemen have the problem of wire cutting tools not being adequate for the new high strength wires which are extremely hard to cut. The hard springy wire dulls the pliers and the pliers are subjected to twisting strains as the men attempt to cut the wire.

The special high leverage cutting pliers illustrated in *Figure* 10 is especially designed for clean and easy cutting of insulated and hard drawn bare wire. It has a high leverage for easy one-hand operation without extra

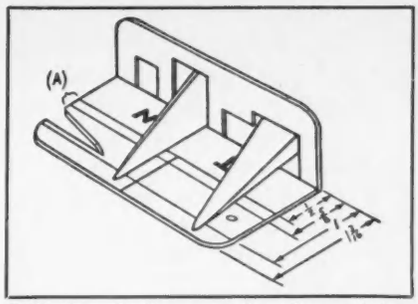

FIG. 8:—Gaff gauge for determining correct width, thickness, and length of gaff.

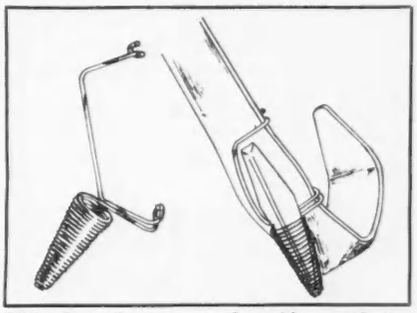

FIG. 9:—Spring steel gaff guard designed to be placed over gaff and clipped to leg iron.

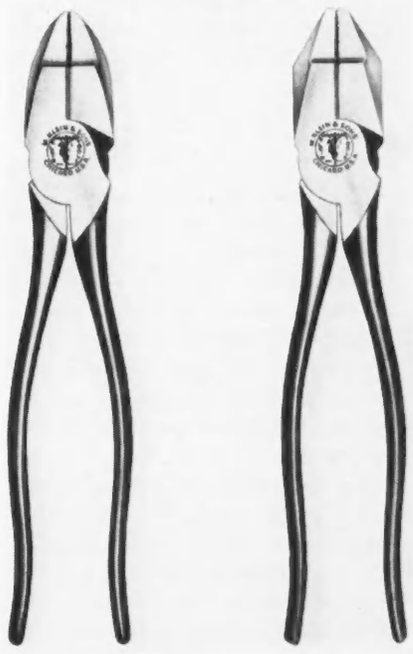

FIG. 10:—High leverage cutting pliers designed for clean and easy cutting of insulated and hard drawn bare wire especially 109-E extra high strength tension line wire. Left — 213-9NE plier with streamlined head. Right — 213-9 regular head.

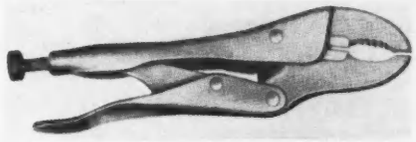

FIG. 11:—Thin nose wrench in 7-inch and 10-inch sizes with side cutters for use where high gripping strength with locking feature is required.

hinging, thereby eliminating the need for wide spread width of the handles. This tool can be used as a regular side cutting plier. The plier measures approximately nine inches overall and can accommodate up to No. 2 weatherproof, hard drawn, solid copper wire. However, its special interest to telephone linemen is that it will cut 109 extra high tension line wires used in long span construction and in support wire of rural distribution wire.

Other hand tools that have become popular with telephone company linemen are a "Vise Grip" wrench illustrated in *Figure* 11 and the multi-purpose pump plier shown in *Figure* 12.

The Vise-Grip wrench is a powerful tool useful in many applications

FIG. 12:—Multi-purpose pump plier with five adjustments and 1-3/4 inch capacity designed for high gripping power in hard-to-get-at places.

where a high pressure grip is required. Linemen have found a great variey of uses for this type of tool, particularly when it is desired to hold together two parts to be assembled or worked on.

It can be used to hold stubborn carriage bolts that have become rusted so that the nut cannot be removed without the head turning around in the wood. This tool can be used to grip the head of the bolt through the wood and hold it in position while the nut is backed off with another wrench. It has a locking feature which enables it to be left in position after the pliers is closed down on the work.

The so-called pump plier shown in *Figure* 12 can be used for similar purposes where high gripping power is needed. It differs in that it has a higher capacity and is adjustable to various widths up to one and three quarter inches and can be employed in hard-to-get-at places. It cannot be locked in position like the Vise-Grip wrench.

Drill Bits and Thread Cleaning Tool

DRILL BITS are commonly used for boring holes in wood poles and crossarms. These boring bits are the so-called single twist, solid-center auger, solid-center car, and ship auger car bits, and bell hanger drills designed for use in a hand brace. Many telephone companies are obtaining labor saving and reducing time and effort in boring holes by employing wood boring bits adapted for use in electric power drills.

The drill bits illustrated in *Figure* 13 are specifically designed for use in portable ½ inch electric drills. These drills have fine pitch screw points to compensate for the high speed of the electric drill. They are completely heat treated for extra strength and the shanks are accurately machined for precise alignment of the bit throughout. Drill bits having the 9/32 inch or larger have three flats to properly engage in a three-jaw chuck.

Another tool of interest is the thread cleaner illustrated in *Figure* 14 for renewing battered and rusted threads. This tool would be useful on crossarm bolts, also carriage bolts that have become badly rusted on

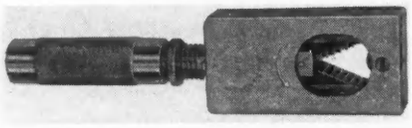

FIG. 14:—Thread cleaner for cleaning bolt threads of different sizes.

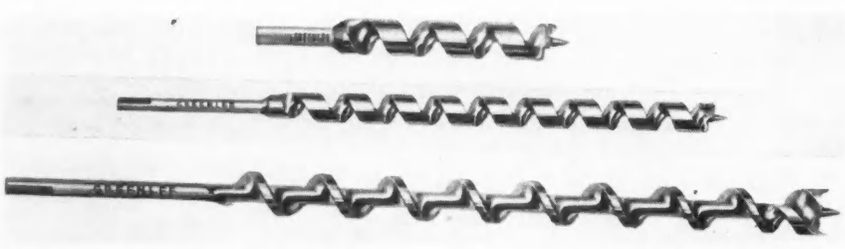

FIG. 13:—Typical wood boring bits for use in portable electric drills. Top — Single-twist electric-drill bit with single cutter-head fitted with one outlining spur for smooth, easy boring. Center — Ship-auger electric-drill bit with single cutter head, but no outlining spur for very easy boring where holes need not be extremely smooth. Bottom — Solid-center electric-drill bit having head of extension-lip type with double cutters, and two outlining spurs for smooth, accurate boring.

FIG. 15:—Roller chain (left) and coil chain (right) 3/4 ton capacity hoists.

which it would be difficult if not impossible to hack off the nut. It can be used on bolt sizes from ¼ inch to 1 inch in diameter. In use the tool is tightened to the bolt where the teeth fit snugly and is turned in the proper direction, cleaning and renewing the thread and enabling the bolt to be reused.

Ratchet Type Chain Hoists

RATCHET type chain hoists are very useful in construction work. They are powerful tools of a convenient size and weight for pulling up guys, tensioning messenger strand, transferring cable from one attachment on the pole to another, and for a variety of other work requiring pulling or hoisting. Such tools are efficient in operation and will save considerable time and effort in pulling or hoisting work. They are easier to use than ordinary block and tackle and less cumbersome.

Figures 15 and 16 illustrate a line of chain hoists suited for telephone construction work. The Safety Pull Models shown in *Figure* 15 are equipped with a dual ratchet pawl assembly, independent of each other, keeping the load locked at all times and preventing the possibility of the hoist dropping its load. When no load is on the hoist, slight pressure on a thumb latch on the lever handle

frees the chain and enables it to be pulled up or down through the hoist without operating the handle.

The hoist handle is reversible to permit operating the hoist in any direction. The handle is designed to bend at the maximum load before the chain can break or the hooks spread out, providing a safety feature. Safety stops prevent spinning of the handle in case the operator's hand should slip off the handle. *Figure* 17 indicates a typical use for the Model AG Safety Pull Hoist.

The Super Power Hoist shown in *Figure* 16 (*a*) has 85 per cent efficiency, requiring only 60½ pounds of handle pull to lift a 1½-ton load for the Model LA-1½ shown. The L-3 Model which is a double chain type will lift 3 tons on a 62-pound handle pull. The double chain model can be converted to a single chain type with faster lifting speed at half the capacity.

Figure 16 (*b*) illustrates a small, light-weight type of hoist that is capable of pulling 500 pounds for the MP-5 Model or 1,000 pounds for the MP-10. For high speed pulling, the handle can be locked at right angles for cranking. The handle will bend if the hoist is overloaded, providing a safety feature. It is very compact and will fit neatly into a small tool box. This tool is well suited for pulling up line wires, small guys, and light cables.

In *Figure* 16 (*c*) and (*d*) are shown a safety load binder and a stand type hoist which embody several useful features. The load binder shown is designed for binding loads of up to 3,000 pounds on a truck trailer, such as poles and/or crossarms. Tightening, releasing, and free chaining is controlled by a button in the handle and a side lever control on the binder body. The handle will not fly as the pawls are designed to prevent load slipping. The stand type hoist is used for pulling poles, as a high lift jack for trucks, and as a load binder.

Another type of chain hoist is the puller, shown in *Figure* 18, a portable light weight, compact device operated by a ratchet handle and having a capacity of ¾-ton. Being made of aluminum alloy, it weighs only 14 pounds. It is used for pulling any object in a horizontal or vertical direction or at any possible angle. An automatic friction type load brake holds

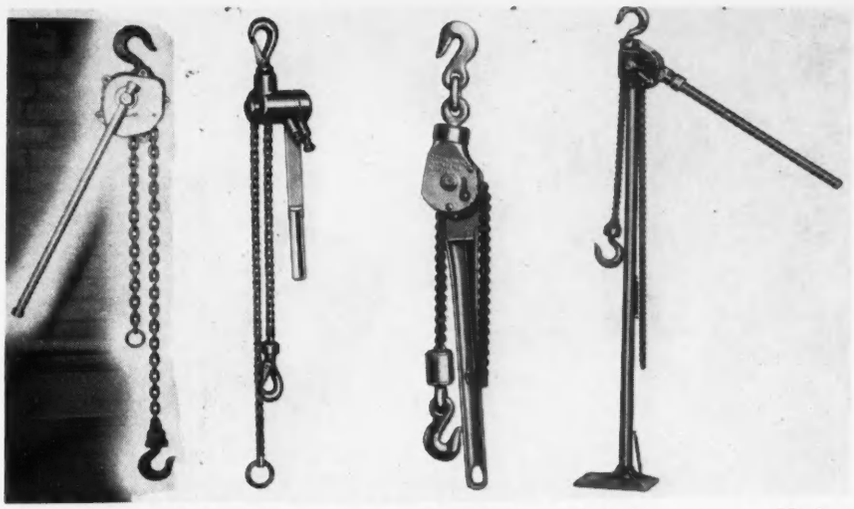

FIG. 16:—(a) Left — Super power chain hoist. (b) Left center — Mighty Midget puller. (c) Right center — Safety load binder designed for binding operations requiring up to 3,000 pounds capacity. (d) Left — all chain hoist. Two models are available: HJ-1 for 2,000 pounds, and HJ-2 for 4,000 pounds capacity.

FIG. 17:—Ratchet lever hoist shown tightening a guy wire.

the load securely at any point. The flexibility of the alloy steel welded chain makes the puller suitable for a variety of applications and also adds to the convenience of handling and storing the unit itself.

For the puller shown in *Figure* 18, only 58 pounds pull on the lever is needed to lift a capacity load of ¾ ton. No lubrication is required, since the shafts are accurately ground for good journal contact at bearing points and oil impregnated bronze bushings are used on all rotating or bearing points for minimum friction and maximum efficiency. The brake operates dry and the brake ratchet has a bronze bushing to avoid wear. The gears are packed with non-aging grease at the factory and sealed in a dust-proof, grease-tight enclosure. A balanced cam on the brake provides uniform operation and reduced effort in lowering. After each lever action, the brake automatically and instan-

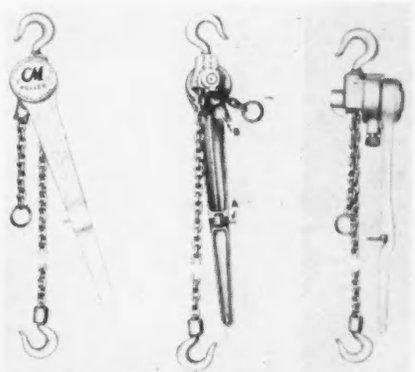

FIG. 18.—3/4-ton Puller. Left — Front view of hoist. Center — Showing brake release button "B" and trigger "A" controlling operation of hoist. Right — Side view of hoist.

taneously engages itself to hold the load at any position. Accurate "spotting" of the load results from a large number of teeth in the brake ratchet.

A guide is provided inside the housing for proper seating of each link of chain on the lift wheel, preventing the load chain from twisting or slipping over the pockets of the lift wheel.

To use the puller, the top swivel hook (*Figure* 18) is attached to a stationary object. Trigger "A" and button "B" are pulled outward and given ¼ turn to a neutral position. This provides "free wheeling" as the brake is released leaving the lift wheel free. Then the chain can easily be pulled by hand in either direction so that the bottom swivel hook can be attached to the object to be pulled or lifted. The button "B" is turned back to its active position to re-engage the brake. The thumb operated trigger

Please turn to page 78

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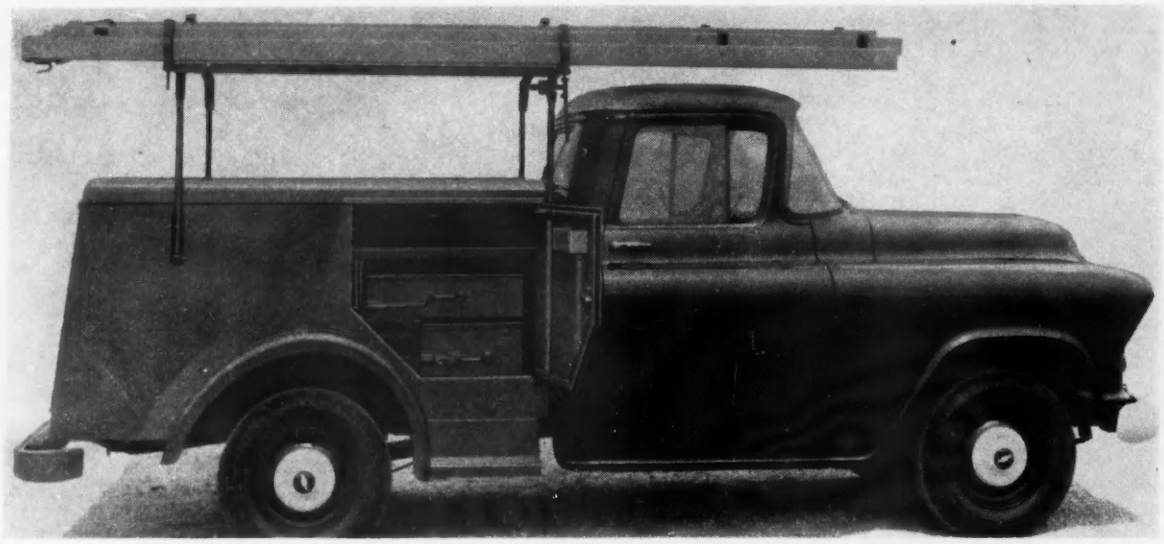

FIG. 1:—Telephone installation body, side view. This truck features an overhead rack with eccentric-type ladder hold-down. The rack can be equipped to carry single or extension ladders, or both, and provided with special brackets for crossarms.

"Mobile Storerooms"

For The Busy Combinationman

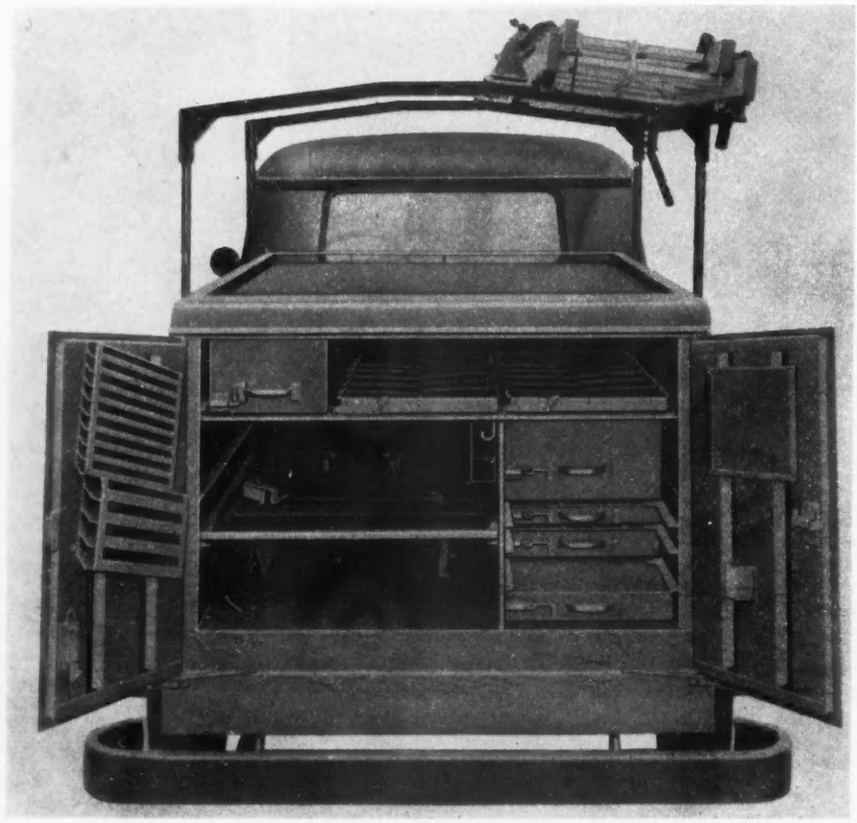

FIG. 2:—Telephone installation body. Rear view showing arrangement of drawers and shelves. Lower left compartment extends through body for long tools, ground rods, and step ladder.

By RICHARD ALLEN

IN LARGER towns, a plant man assigned to installing telephones is generally called an installer. Another assigned to the locating of trouble in telephone lines, station equipment, and instruments is designed as a troubleman or repairman.

In small towns and rural areas, the plant worker takes on other duties. He may make temporary repairs in telephone cable until a regular cable splicer can be brought into the area for this work, or he may, as a qualified worker, make simple repairs or adjustments of central office equipment in central dial offices. He is thus classified as a combinationman, and may be regarded as a kind of telephone jack-of-all trades.

Telephone combinationmen usually work alone unless they require help as in erecting light poles in farm leads. For this reason, they do not need heavy trucks, and usually drive ½-ton trucks. Such trucks may have heavy springs, larger diameter clutches, heavy-duty tires, and may be

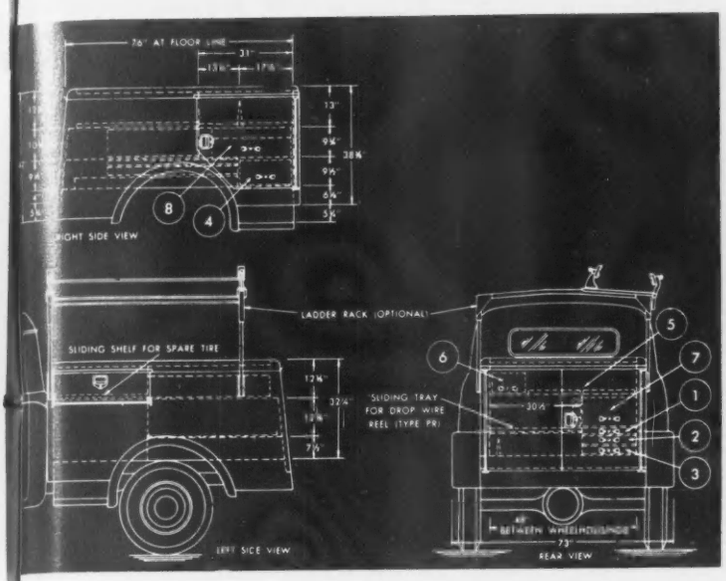
RIGHT SIDE VIEW
LADDER RACK (OPTIONAL)
SLIDING SHELF FOR SPARE TIRE
SLIDING TRAY FOR DROP WIRE REEL (TYPE PR)
LEFT SIDE VIEW
REAR VIEW

FIG. 3:—Typical layout of telephone installation body.

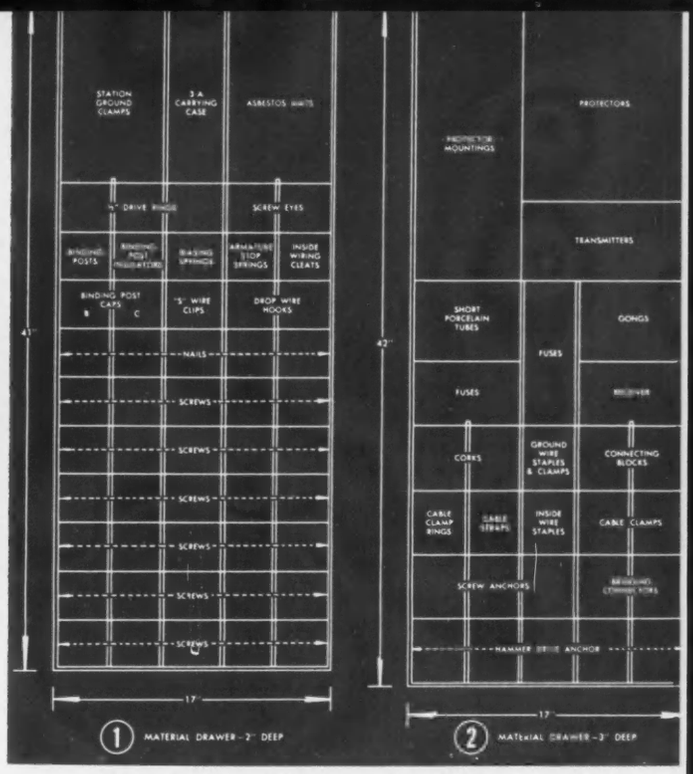

FIG: 4—Material drawers 1 and 2 for typical telephone installation body.

provided with rear bumpers of heavy construction. These trucks are designed to be mobile storerooms as well as tool rooms with every needed material and tool in required quantities in their proper places on the truck body.

Modern Installation Bodies

AS the result of many years of experience with various kinds of telephone installation bodies modern telephone installation bodies for mounting on ½-ton truck chassis are available.

Wherever possible, installation bodies have been designed to be safe for telephone men to use. All tools and materials are so placed as to be obtainable as much as possible from the curb side or the rear of the truck. Such an arrangement reduces the necessity for the telephone combinationman to work on the street side of the truck.

Figures 1, 2, 6 to 10, and 11 illustrate the various types of truck bodies for installers, combinationmen and troublemen. In *Figures* 3, 4, 5, and 12 are illustrated typical compartment layouts.

Typical lists of materials and tools commonly carried on telephone installation bodies to supply requirements of combinationmen are given in *Tables* I and II. The quantities shown are maximum amounts that are generally considered adequate

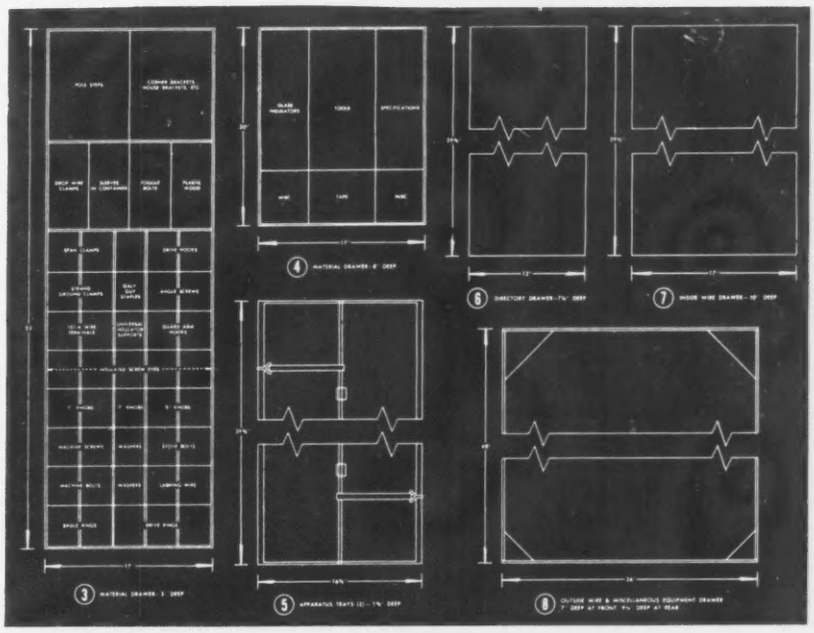

FIG. 5—Material drawers and trays 3 to 8 for typical installation body.

FIG. 6:—Telephone service body. Right side view showing drawers on this side.

for one day or more supply for the combinationman.

With the quantities shown, the total weight of material and tools with the driver runs about 700 lbs., which is well within the 1000 lbs. limit of the ½-ton truck. This limit would allow the carrying of a second man if that should be necessary and possibly a few special items to be used on a job assignment. Heavy materials such as crossarms or coils of line wire are carried on a light pole trailer hitched to the truck.

FIG. 7:—Telephone service body. Left side view showing tire compartment.

Ladders

AMONG the important tools that a combinationman uses are ladders. It is the practice of many companies to furnish a 4-ft., sometimes a 6-ft. step ladder, and an extension ladder ordinarily 24-ft. long. The extension ladder is usually arranged so that it can be separated into two sections with one section left on the truck and the other used as a single ladder.

The ladders are equipped with ladder hooks or strand hooks to enable the ladder to be used with safety on the strand whenever it is necessary for a combinationman to climb up to the cable messenger to place an attachment as, for example, a drop wire attachment. These strand

Please turn to page 86

Table I — Suggested Maximum Quantities of Materials Carried on Combinationman's Trucks

MATERIAL	QUANTITY
Anchors, Hammer Drive 1/4" x 1"	6
Anchors, Hammer Drive 5/16" x 1 3/4"	6
Anchors, Lead Screw 3/4" x #6-8	25
Anchors, Lead Screw 1 1/2" x #6-8	25
Anchors, Lead Screw 1" x #10-14	18
Anchors, 1 1/2" x #10-14	18
Backboard, Protector	2
Blocks, 2-Point Connecting	4
Blocks, 3-Point Connecting	4
Blocks, Protector and Protector Units, (Miscellaneous types) carried in 8 compartment plastic box — Total	100
Blocks, Protector in carrying case with Cleaning Brush on end — Total	32
Bolts, 1/8" x 3" Toggle	10
Bolts, 1/8" x 4" Toggle	10
Bolts, 3/16" x 4" Toggle	10
Bolts, 1/4" x 4 " Toggle	5
Bolts, 5/16" x 2" FH Stove	5
Bolts, 5/16" x 3" FH Stove	5
Bolts, 3/16" x 1 1/4" Carriage (with extra 10/24 nuts)	8
Bolts, 3/8" x 3 1/2" Carriage	2
Bolts' 3/8" x 4" Carriage	2
Bolts, 3/8" x 4 1/2" Carriage	2
Bolts, 3/8" x 6" Carriage	2
Bolts, 3/8" x 8" Carriage	2
Bolts, 1/2" x 4 1/2" Transposition	2
Brackets, Corner	1
Brackets, Deadend, and Spool Insulators	4
Brackets, House	6
Brackets, Wood Pole	6
Clamps, 1-Bolt Guy	1
Clamps, Type C Span	8
Clamps, 1/8" B	18
Clamps, No. 405 Galv.	25
Clamps, #5 Brown Cable	12
Clamps, Station Ground	10
Clamps, Drop Wire	25

MATERIAL	QUANTITY
Clips, Type "S" Drop Wire	6
Cobs, Transposition	2
Cords, for each type of desk handset	2
Dials	1
Directories, Telephone	6
Dry Cells #6	2
Fuses for pole protectors	6
Fuses for station protectors	10
Ground Rods, Station	4
Guards, Type "P" Drop Wire	2
Handpieces, for each make of telephone instrument	1
Hooks, Drive	10
Hooks, Drop Wire	4
Hooks, Guard Arm	4
Insulators, Toll	2
Insulators, Exchange	6
Jacks, Station, flush type	2
Jacks, Station, non-flush type	2
Plug, 283-B for Station Jack	2
Knobs, Type "C"	50
Knobs, Type "S"	10
Knobs, Type "T"	5
Nails, Galvanized 6-D	1/4 #
Nails, Galvanized 30-D	6
Nails, Galvanized 50-D	6
Nails, Brown Inside Wiring, 1/2"	200
Nails, Ivory Inside Wiring, 7/8"	100
Nails, Brown Inside Wiring, 7/8"	100
Nails, Ivord Inside Wiring, 7/8"	100
Nails, Pole Class	5
Nuts, 5/8" for crossarm bolts	2
Pins, Wood Insulator	6
Protectors, Station Outside Type	3
Protectors, Station Inside Type	4

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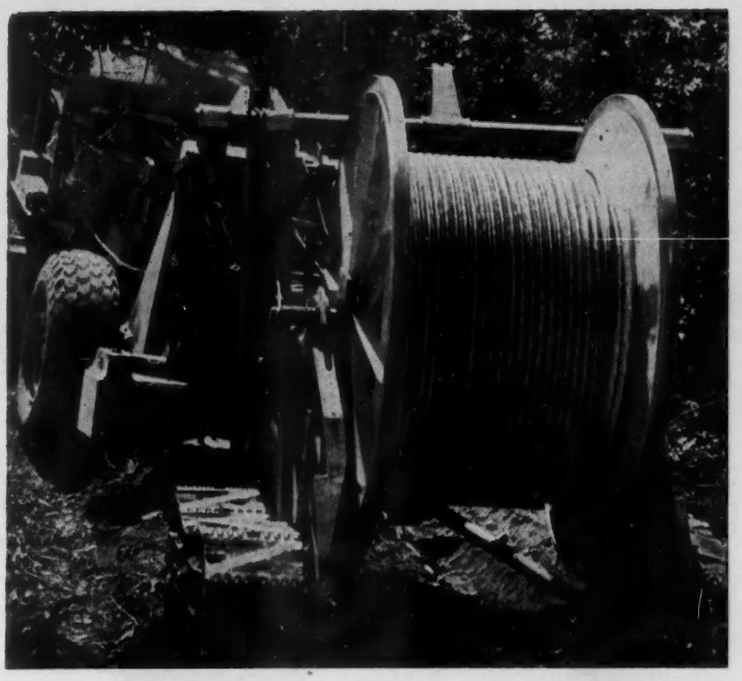
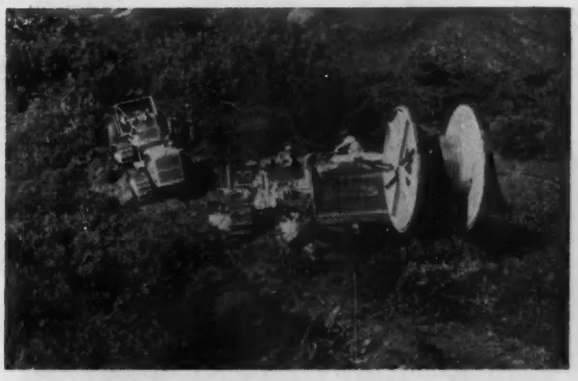


Modern Cable Construction

Section VIII-C of Mr. Reed's article continues the discussion of — (1) spinning cables to its supporting messenger; and (2) precautions to assure tight lashing of cable. Section VIII-B of this article appeared in the August issue of "TELEPHONE ENGINEER & MANAGEMENT."



By JOHN S. REED

FOR FIELD lashing of telephone cable to messenger strand, the General Machine Products Company produces Model "B," "C," and "D" lashing machines.

The "B" cable lasher, illustrated in *Figure* 199, is a compact, efficient machine of light weight construction for lashing sheathed aerial cable to the messenger strand. It can be quickly adjusted for various sizes of cables and uses .091 or .061 inch lashing wire.

This lasher will take cable from ½" in diameter up to a maximum of 2½" in diameter. It is made of cast aluminum alloy for maximum strength with minimum weight. The machine has a low center of gravity when placed on the messenger strand which minimizes vibration in operation. The streamlined housing is designed to slip through tree branches and other obstructions during the lashing operation without catching on them.

Figure 200 shows the principal parts of the "B" lasher and indicates its overall dimensions. This machine is provided with two adjustable cable lifting arrangements, one at each end, to lash the cable snugly to the strand or to allow for a positive separation at span clamps. Two deeply grooved rubber strand wheels are employed on opposite ends of the lasher to provide continuous driving power to the rotating drum as it travels along the messenger.

The spinning drum operates on sealed ball bearing surfaces with a number of other ball bearings in addition to needle bearings providing

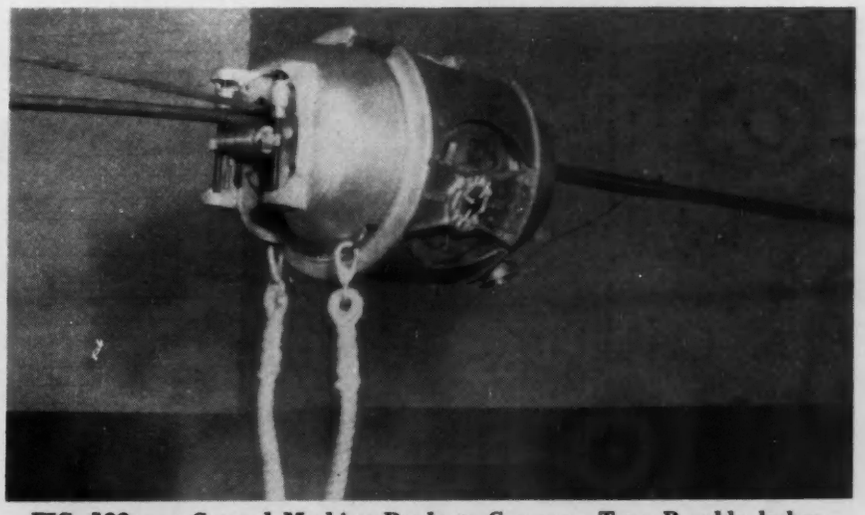


FIG. 199: — General Machine Products Company Type B cable lasher.

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Mr. Smith likes blue, the missus is holding out for beige—and they may end up with *both*. Miniature Color Monophones are so unusual, so exciting, the Smiths will probably *sell each other*.

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Here are a few tips on using the set:

- Arrange all eight miniatures as an attractive display in your business office. They'll fit in only half the space regular telephones would take!
- "Spot" the miniatures in store windows, in the bank, city hall, and other heavy-traffic locations. Wherever you put them, you'll attract prospects!
- Give sets to your commercial representatives and installers. Small and light in weight, the sets make convenient sales tools.

Order several sets of Miniature Color Monophones today—immediate delivery. Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*

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ease of operation. A back tensioning device prevents slack occurring in the lashing when tension on the pulling line is relieved momentarily. A locking bolt on the side is employed to lock the drum in alignment to the opening in the housing, permitting the cable lasher to be applied to the cable and messenger at any point. In this manner, the strand will be correctly positioned in the pulley grooves.

The "C" cable lasher shown in *Figure* 201, is employed for lashing aerial cables up to 1⅝″ in diameter to messenger strand 5/16″ in diameter and the "D" lasher for cables up to 3¼″ in diameter to messenger strand ¼″ to ½″ in diameter. *Figure* 202 illustrates the "D" type which is designed to lash one or more cables to a single messenger strand with the total diameter of the assembled cables not over three inches.

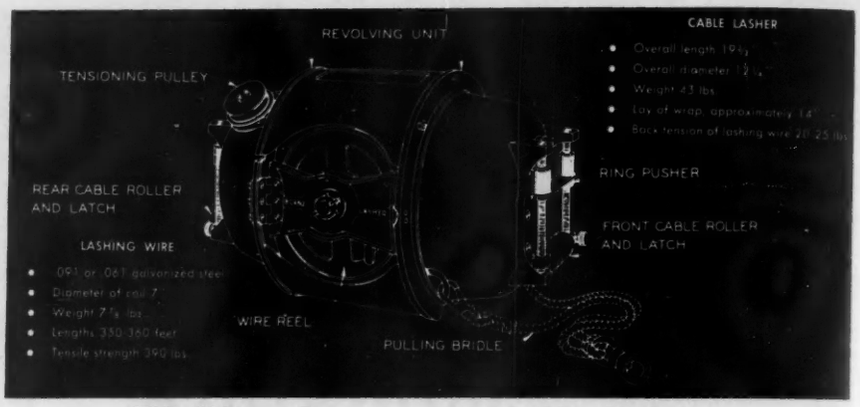


FIG. 200: — Component parts of "B" cable lasher.

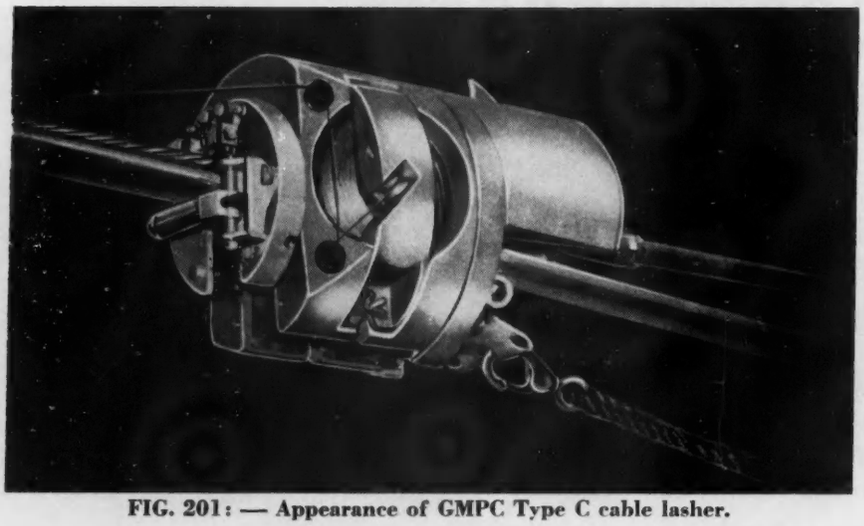


FIG. 201: — Appearance of GMPC Type C cable lasher.

The "C" and "D" models are designed to use .045 inch stainless steel lashing wire and do not accommodate larger wire sizes. Whenever extra strength is needed, two lashing wires may be used at one time. In this case, the wire is fed from two coils, one on each side of the rotating drum. This will result in the distance between spiral lays being approximately halved. Since the machine uses .45 inch lashing wire with 1200′ of wire in each coil, one loading with two coils of wire is sufficient for several hours of operation. Lashing is said to be smooth and effortless with a minimum of pulling load from the ground or parallel to the messenger. A smooth and uniform lashing is produced even under conditions of wet or icy strand.

The Models "C" and "D" machines have automatic features, such as a finger tip operated, all—range strand tensioning device, a self-registering drum lock, a two-way brake to prevent back roll and a center-fed non-rotating wire coil. Beside the rotating drum, the lasher has a carriage providing mounting for a driving mechanism, cable lifters, cable and strand rollers, a brake and a pulling attachment. The rotating drum has two magazines for accommodating 1200′ coils of .045″ lashing wire. Two sets of pulleys are provided to guide and tension the wire in the lashing operation. Like the type "B," the "C" and "D" lashers are sturdily constructed and have sealed ball bearings on all vital shafts and on the rotating drum. *Figures* 203 and 204 illustrate the component parts of the "C" and "D" lashers.

Two rubber strand drive wheels are mounted on the forward part of the carriage and a small trailer wheel is located in the rear with driving accomplished through direct gearing. The rear cable lifter roller is adjustable vertically. The front cable lifter, together with the pulling plate, is opened by pressing a latch. In the open position, this latch locks the drum automatically when the cable slots register with slots in the carrier. The drum is free to revolve after closing the front cable lifter. Both the front and rear cable lifters are held

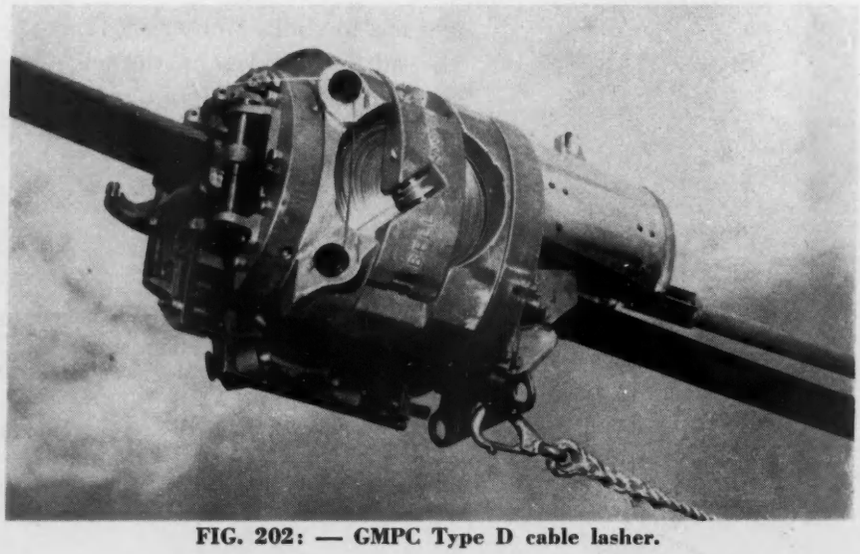


FIG. 202: — GMPC Type D cable lasher.

in the open position by a toggle device.

The pulling rope may be attached in one of three holes in the pulling plate. On the "C" lasher an eye is provided on the side of the front carriage for excessive side pulls. Choice of attaching points depends on the angle of the towing line.

The lasher has an automatic brake which releases when the front cable lifter is opened, also when the pulling plate is moved back against its top. The automatic brake operates when the machine is stopped and the towing line is slackened. The brake is released when towing is resumed. With this arrangement, it is not necessary to maintain tension in the towing line while the lasher is stationery.

On the "C" lasher, when the towing line is attached to one of the pulling eyes on the carriage a separate line may be used to release the brake.

The lasher may be moved backward by clamping the lashing wire to the messenger and then releasing the brake by pushing against the pulling plate. If the machine is out of reach and the towing line is fastened to the pulling plate, the brake may be released by pulling back on the towing line.

The manufacturer has published detailed instructions for inserting lashing wire coils in the magazine drums and for handling the lashing machines in placing them on or removing them from messenger strand and in transferring them around poles. The machines are designed to accomplish these operations with the minimum of time and effort.

Instructions provided by the manufacturer for the proper lubrication of the lashing machines should be followed carefully for maximum operating efficiency of these machines.

A carrying case is provided for transporting the machine. This case must be used at all times when the machine is not on the strand. This will protect the machine from damage such as might occur if the machine were placed on the ground where dirt or mud would get inside.

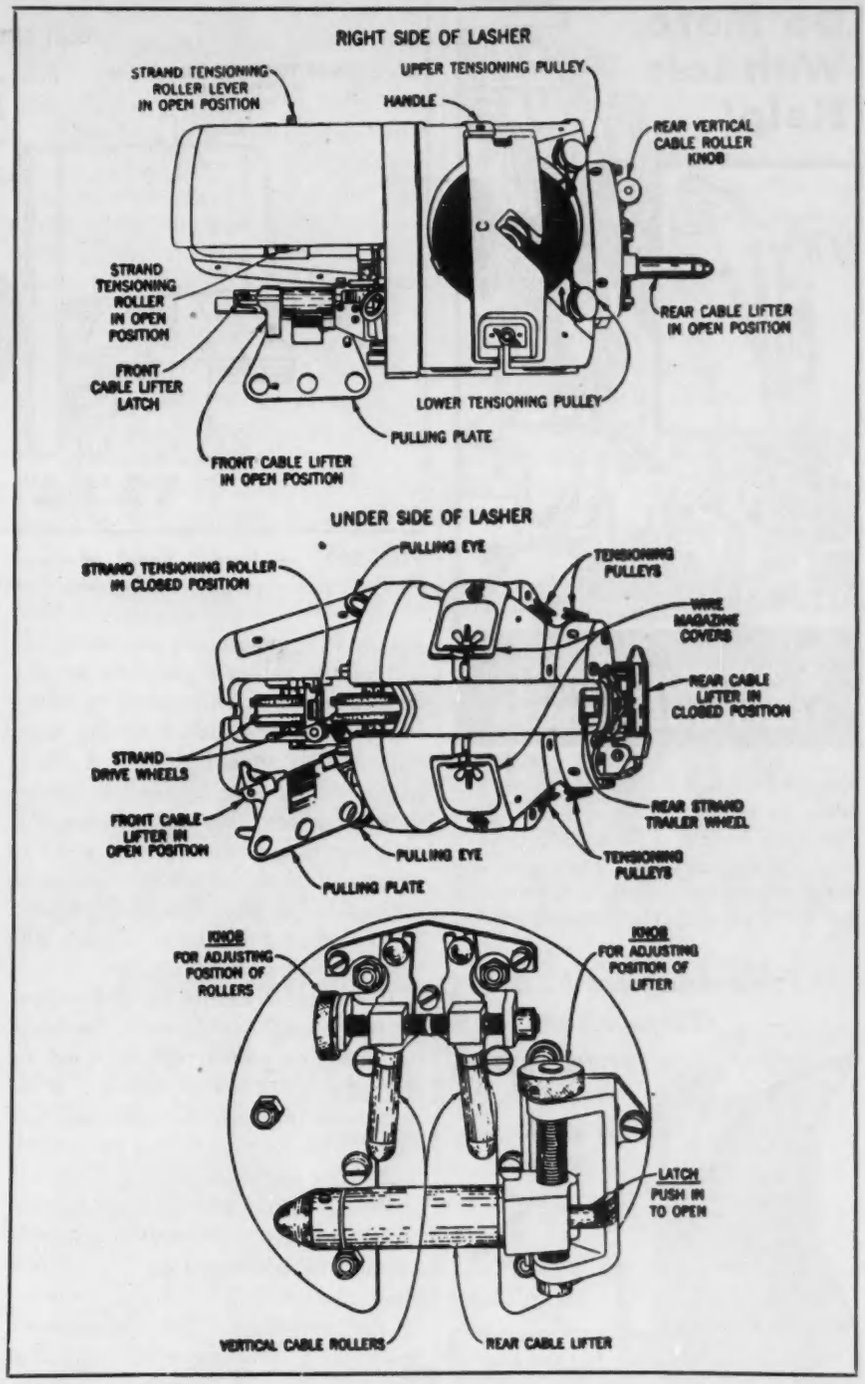

RIGHT SIDE OF LASHER
STRAND TENSIONING ROLLER LEVER IN OPEN POSITION
UPPER TENSIONING PULLEY
HANDLE
REAR VERTICAL CABLE ROLLER KNOB
STRAND TENSIONING ROLLER IN OPEN POSITION
REAR CABLE LIFTER IN OPEN POSITION
FRONT CABLE LIFTER LATCH
LOWER TENSIONING PULLEY
PULLING PLATE
FRONT CABLE LIFTER IN OPEN POSITION
UNDER SIDE OF LASHER
PULLING EYE
STRAND TENSIONING ROLLER IN CLOSED POSITION
TENSIONING PULLEYS
WIRE MAGAZINE COVERS
REAR CABLE LIFTER IN CLOSED POSITION
STRAND DRIVE WHEELS
FRONT CABLE LIFTER IN OPEN POSITION
REAR STRAND TRAILER WHEEL
PULLING EYE
TENSIONING PULLEYS
PULLING PLATE
KNOB FOR ADJUSTING POSITION OF ROLLERS
KNOB FOR ADJUSTING POSITION OF LIFTER
LATCH PUSH IN TO OPEN
VERTICAL CABLE ROLLERS
REAR CABLE LIFTER

FIG. 203: — Details of Type C cable lasher. (Courtesy of General Machine Products Company)

Precautions to Assure Tight Lashing of Cable

THE CABLE lashing machine should be operated in the proper manner to prevent loosening of the lashing wire spirals which is the cause of cable bows sometimes seen in spun-cable. The machine should not be started or stopped suddenly. When the lasher is stopped for any reason, the towing line on "B" cable lashers should be kept under tension until the lashing wire is clamped to the messenger or the towing is resumed. ("C" and "D" lashers are equipped with internal brakes and do not require this precaution.)

The cable should be kept under slight tension while being lashed. The method of doing this has been explained in a previous section. The tension should be maintained throughout the cable until the lashing is completed and all wire ties and splices have been permanently made. At ends of cable sections, the overlapping ends should be taped together to the messenger with friction tape and, at dead ends, the cable should be taped to the messenger. Whenever the cable runs off the reel, a man should be assigned to hold cable under tension with a rope and cable grip until lashing machine arrives at the end and cable can be taped to strand.

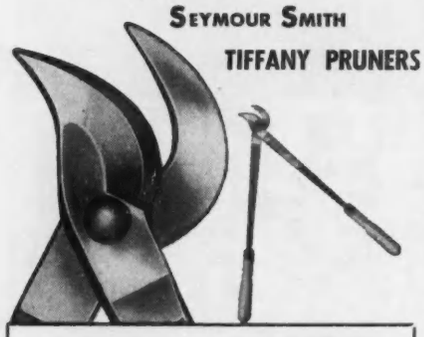
When the cable is spliced follow-

Illustrated above is No. 11 Tree Pruner with center cut action by tempered steel blade that easily handles 1" branches. Head is reinforced malleable iron. Spruce poles with telescoping aluminum joints. For heavier work No. 12-18, capacity 1½". Also Pole Saws.

for clearing brush...

SEYMOUR SMITH

TIFFANY PRUNERS



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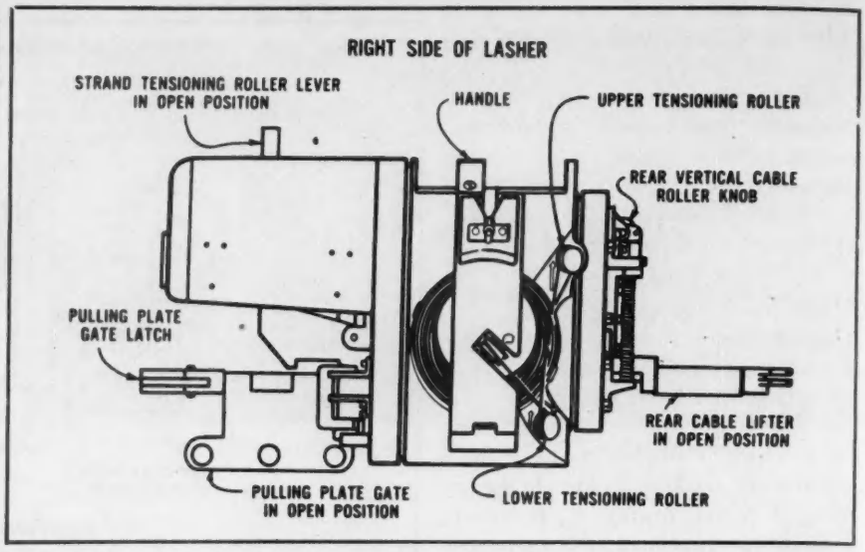
RIGHT SIDE OF LASHER
STRAND TENSIONING ROLLER LEVER IN OPEN POSITION
HANDLE
UPPER TENSIONING ROLLER
REAR VERTICAL CABLE ROLLER KNOB
PULLING PLATE GATE LATCH
REAR CABLE LIFTER IN OPEN POSITION
PULLING PLATE GATE IN OPEN POSITION
LOWER TENSIONING ROLLER

FIG. 204: — Partial detail of Type D cable lasher. (Courtesy of General Machine Products Company)

ing its installation, the stretching effect of the splicer's platform on the messenger may be alleviated by securing the splicer's ladder to the messenger with rope lashings. A slack puller should also be used to introduce slack into the cable during the splicing operations. These precautions will assure a slight tension is maintained in the cable and prevent formation of cable bows. *Figure* 205 illustrates this procedure.

If a cable splice is located within 10 feet of the nearest pole, the lashing machine should not be used to spin the short cable section. It is preferable to secure the splice and the short cable section to the messenger with cable supports.

Before cutting the lashing wire for terminating, a clamping tool such as the one illustrated in *Figure* 206 should be employed to clamp the wire to the messenger. This will prevent inadvertent loosening of the spinning wire. Rapping the messenger sharply several times while pulling on the wire will take out any slack that may be present.

A special procedure is required in terminating .045 inch stainless steel lashing wire. This wire is quite springy and will not tightly wrap

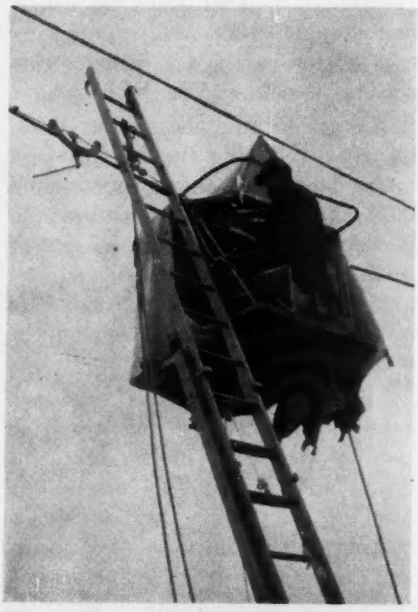

FIG. 205: — Showing how ladder is lashed to messenger to reduce load from cable splicer's platform and how slack puller is employed so cable will be under slight tension on completion of splicing work.

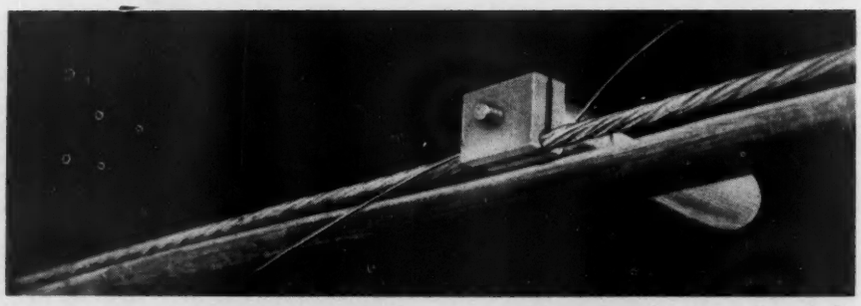

FIG. 206: — General Machine Products Co. lashing wire clamp used to hold lashing wire temporarily on messenger.

around the messenger. In terminating at a suspension clamp it will be necessary to tie the wire down by passing the end of the wire under a previous turn. Where six wraps of ordinary lashing wire on the strand is standard, .045 inch wire is tied down by passing the third turn under the second turn, and the wire end under the sixth turn, and then cutting off the surplus length.

In the case of a splice in .045 inch lashing wire, the wire ends are hooked together and the ends are wrapped around the strand six times on each side of the center. The second, third, and sixth turns are tied down in the same manner as for terminating at a suspension clamp.

When the .045 inch lashing wire is to be clamped to a 7/16 inch (16,000-pound) messenger strand with a clamping tool, a piece of a strap from a lashed cable support should be wrapped around the strand under the lashing wire before applying the clamping tool. The strap will provide a bearing surface for the small diameter wire, enabling the clamp to hold the wire firmly. *To be continued.*

General of Northwest Promotes Three Engineers

THREE PROMOTIONS in the engineering department were announced last month by Roy A. Worley, chief engineer of General Telephone Co. of the Northwest.

Claude E. Munsell was promoted from general traffic engineer to plant extension and building engineer, Roger D. Mills from special projects engineer to plant engineer, and Lee H. Schick from engineer to special studies engineer.

All positions are in the company's Spokane general office and became effective August 1.

Munsell has been with General Telephone Co. of the Northwest since June 1949, when he started as an engineering assistant in the Spokane office. He was subsequently transferred in the same capacity to the company's southern division offices at Moscow where he later became engineer. He was transferred back to the Spokane office and appointed traffic engineer in August 1953, becoming general traffic engineer in March 1955.

A native of Wenatchee, he is a graduate of Lewis and Clark high school, Spokane, and a 1949 graduate of Washington State College with a B.S. degree in electrical engineering.

Mills went to Spokane from Automatic Electric Co. in Chicago and started with the company in July 1949 as an engineer in the Spokane office, later serving in the same capacity in division offices at Coeur d'Alene and Wenatchee. He was named western division engineer at Wenatchee in December 1953 and transferred back to the Spokane office as special projects engineer in November of last year.

Schick is also a native of Illinois, going to Spokane from DeQuoin, Ill. After completing accounting training at Brown's Business College, Rockford, Ill. Starting in the company's Spokane office in December 1945 as a plant accountant, he was advanced to chief plant accountant in May 1951 and named plant accounting supervisor in December 1952. He was transferred to the engineering department in March 1954.

R. R. Branson Joins C & D Batteries, Inc.

RICHARD R. BRANSON, has joined the St. Louis, Mo. office of C & D Batteries, Inc. He will work out of the office of Elmer H. Boyer & Associates.

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THE COMBINATION TAG— and TERMINATING BOARD
Showing the cable pairs properly connected.
TIPS HORIZONTALLY
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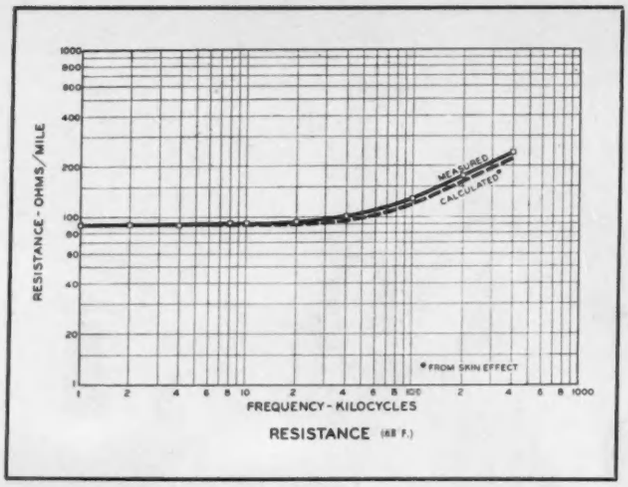

Figure 1:—Rural Distribution Wire 6 Pair #19.

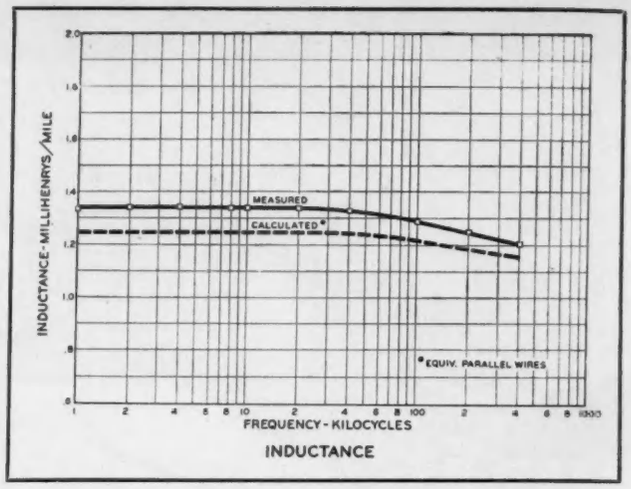

Figure 2:—Rural Distribution Wire 6 Pair #19.

Transmission Characteristics Of Rural Distribution Wire At Audio And Carrier Frequencies

By JOHN A. BRAZEE*

THE PLASTIC rural distribution wire introduced within the past two years is proving increasingly popular for expansion and replacement service in rural and urban areas. Economic advantages, particularly at the time of installation, are largely responsible for this rapid acceptance. Mechanical features are believed to provide an expected service life up to 15 years.

Once the cable is installed, however, attention is then directed to the electrical performance. While rural distribution wire is presently employed primarily for voice frequency transmission, recent interest in it for carrier frequency use is developing. It is the purpose of this paper to discuss the electrical transmission characteristics of rural distribution wire over the frequency range 1 to 400 kilocycles.

Although some rural distribution wire is being produced with as many as 16 pairs, the most common is the six pair construction. The individual #19 AWG bare soft copper conductors are insulated with a 20 mill wall thickness of ASTM Grade 6 type black polyethylene. Mechanical protection and color coding are achieved by a semi-rigid type polyvinyl chloride jacket extruded directly over the insulation. Twisted pairs are then stranded about a polyethylene coated .109 inch high-strength steel line wire. The pairs are relatively transposed through the use of a number of different pair lays, or twists.

Mr. Brazee is chief electronics engineer, Whitney Blake Co.

Method of Measurement

A 1000 foot length of six pair #19 AWG rural distribution wire was installed at the Whitney Blake Company on poles in accordance with presently accepted practices. The site is best described as a typical urban area with the climatic conditions peculiar to Southern Connecticut. The measurements were made in the fall of 1955 following several months of exposure. At this time it was observed that a thin film of a soil-like substance had deposited upon the jacket surface. Since the pair to pair variation was slight, data are shown for a representative pair.

At a given frequency, the input impedance to the line with its receiving end open-circuited (Z_{oc}) was measured by a specially designed bridge. A similar measurement was then repeated with the receiving end short-circuited (Z_{sc}). The bridge is arranged so as to permit a balanced or unbalanced line measurement and to provide readings for both the resistive and reactive components of the impedance. Standards were used to verify the accuracy of the bridge over the frequency range.

The electrical characteristics have been calculated by means of transmission line theory (*See Appendix One.*) from these open-circuit and short-circuit impedances. All curves labeled "measured" are a result of such calculations. Wet weather measurements were carried out following several hours of heavy rain. Numerous points were remeasured in order to assure a constant degree of wetness.

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There are limitations to this method which restrict the frequency range and prohibit measurements at certain frequencies. The input open-circuit and short-circuit impedance values vary with the electrical length, or wavelength, of the line. The exact pattern of this variation is dependent upon the attenuation; with increasing attenuation both impedances will approach a single value, that of the characteristic impedance (Z_0). Whenever the magnitudes of Z_{oc} and Z_{sc} are similar, serious errors result in the calculated value of the complex propagation constant γ. (See equation 4, Appendix I) The useful frequency range is limited therefore, to a band providing a ratio of Z_{sc} to Z_{oc} much greater or much less than one.

The magnitudes of Z_{oc} and Z_{sc} are equal for frequencies at which the physical line is an odd multiple of the one-eighth wavelength. Measurements at or near these frequencies are not practicable. However, by a proper selection of the physical length of line, the described method of measurement may be employed with a useful accuracy as indicated by the dispersion of the graphical data points.

Primary Constants

THE TRANSMISSION characteristics of a line are dependent upon four parameters; resistance (R), inductance (L), capacitance (C) and conductance (G). Their magnitudes are direct functions of length and are influenced by frequency.

(A) Resistance:—The d-c resistance of a conductor is, of course, controlled by its diameter and the resistivity of the material. At high frequency a-c operation the current density is no longer uniform over the conductor cross-section due to skin-effect. In round wires, current tends to concentrate in a thin layer at the conductor surface. The thickness of this layer is often referred to as the "skin depth" or "depth of penetration" (δ). However, since depth of penetration is defined as the point at which the current density has been reduced to 1/e (approximately 36.8%) of the surface value, some current does flow below this layer. The a-c resistance increases with frequency as a result of this reduction in the effective cross-sectional area. When δ is much smaller than the conductor radius, the a-c resistance increases nearly as the square root of the frequency.

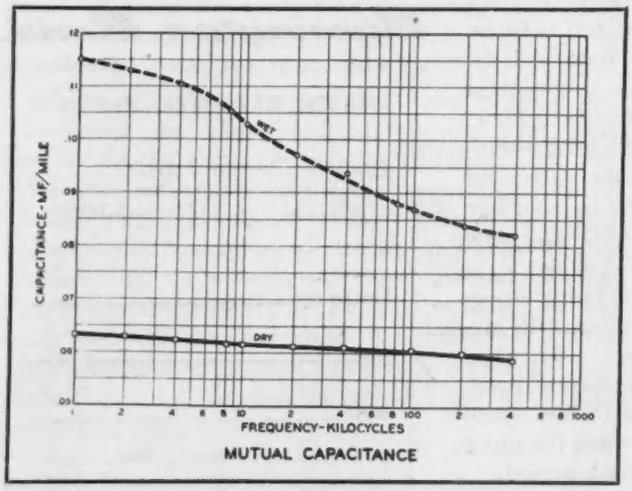

Figure 3:—Rural Distribution Wire 6 Pair #19.

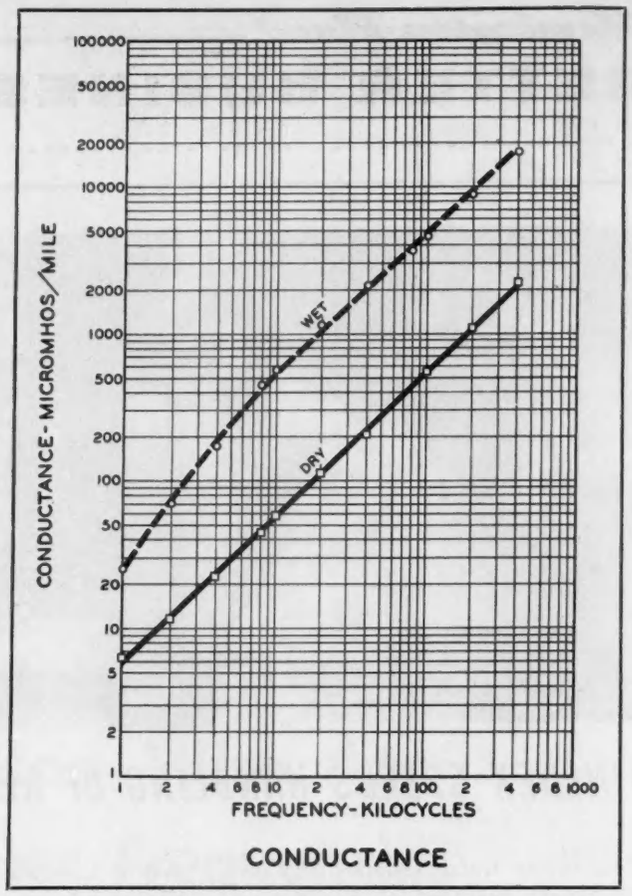

Figure 4:—Rural Distribution Wire 6 Pair #19.

For frequencies up to 400 KC the depth of penetration in 19 AWG bare soft copper is not small compared to the radius ($\frac{r}{\delta} < 4$). Therefore, the resistance does not increase as the square root of the frequency in this range. A calculation of resistance vs. frequency due to skin effect is shown in *Figure 1.*

The a-c resistance of a pair of parallel wires is further increased by proximity effect whenever the conductor spacing is small in relation to the conductor radius. At high frequencies, when the radius is much larger than the skin depth, the percentage increase due to proximity is nearly constant. Since the proximity factor is not present at low frequencies, it follows that a transition area will exist where the proximity factor increases with frequency.

Referring to *Figure* 1, at 400 KC it is observed that the measured resistance is nine per cent greater than resistance due to skin effect only. Since the conductor spacing is not large compared to the radius, a substantial proximity factor may be anticipated.

(B) Inductance:—Total inductance of a two wire line is the sum of internal and external inductances. The latter is dependent only upon the permeability of the material surrounding the wires and the ratio of conductor spacing to diameter. The internal inductance decreases with increasing frequency due to skin effect. This drop in the total inductance is demonstrated in *Figure* 2 for both the measured and calculated curves. Calculated values assume an equivalent parallel line. The difference in the relative levels of the two curves, approximately seven per cent, is thought to be due to the

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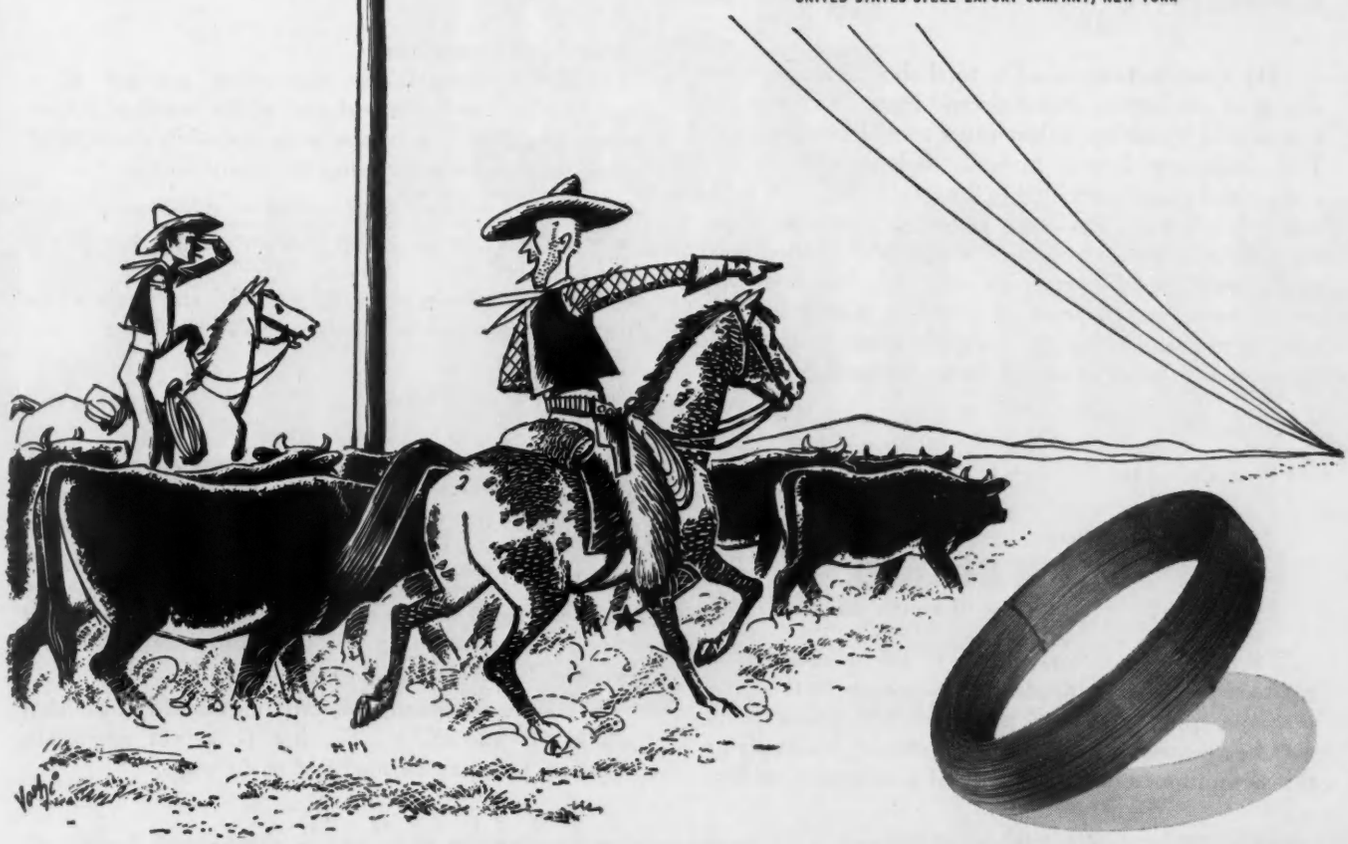

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effect of the steel support wire upon the external inductance.

(C) Mutual Capacitance:—The mutual capacitance of a two wire line in free space is, in general, governed by the physical dimensions, and is independent of frequency. However, when these conductors are surrounded by a dielectric material other than air, the mutual capacitance will be altered by a factor equal to the dielectric constant of the material.

The composite dielectric separating the conductors of rural distribution wire is composed of polyethylene, polyvinyl chloride, and air. The dielectric constant of polyethylene and air remains essentially stable over a wide frequency range. The constant for polyvinyl chloride, however, may be affected somewhat by frequency. The addition of rain, sleet, snow, etc. to the air space would, of course, affect the magnitude and behavior of the mutual capacitance.

The measured mutual capacitance is shown in *Figure* 3 under both dry and wet conditions. It will be noted that the capacitance of the wet wire decreases in comparison to the wire when dry. The capacitance increase due to wet weather is approximately 85% at 1 KC and 40% at 400 KC. When the wire is completely immersed in a tank of water, the mutual capacitance is .125 mf/mile at one kilocycle. This is approximately eight per cent greater than the value measured during a rainstorm.

(D) Conductance:—The total shunt leakage, consisting of conduction and dielectric hysteresis losses, is represented by an equivalent value termed conductance. The conduction loss is virtually independent of frequency and contributes little to the total leakage for lines employing a good insulating material. The leakage assignable to dielectric hysteresis is negligible in the lower audio range, but increases directly with frequency. In carrier work, for all practical purposes, it may be considered responsible for the complete shunt loss.

The power factor of an insulating material is defined as:

$$PF = \sin\left[\tan^{-1}\frac{e''}{e'}\right] \qquad (1)$$

where:

e'' = loss factor
e' = dielectric constant

The ratio e'' to e' corresponds to the relationship of conduction current to displacement current. As this ratio is usually quite small for a good dielectric, power factor may be assumed equal to the proportion e''/e'. Applying this definition to the admittance of a transmission line,

$$PF = \frac{G}{\omega C} \qquad (2)$$

or

$$G = \omega C\,(PF) \qquad (3)$$

Therefore, the power factor of such an insulating material serves as a useful measure of the dielectric loss.

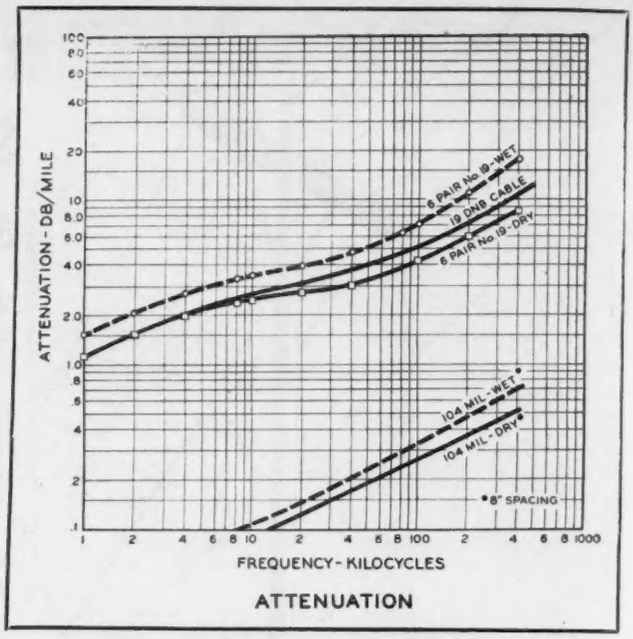

Figure 5:—Attenuation of Various Constructions.

Since it is a function of frequency, a range of values will exist for any given insulation.

It may be observed in *Figure* 4 that the wet weather conductance values are approximately ten times greater than the dry. A variation of this order would not be unexpected.

Secondary Constants

(A) Attenuation:—The attenuation constant of a transmission line is the real part of the complex propagation constant. For a line with smoothly distributed constants the attenuation may be calculated as:

$$\alpha = \sqrt{\tfrac{1}{2}\left[\sqrt{(R^2 + \omega^2L^2)(G^2 + \omega^2C^2)} + RG - \omega^2LC\right]} \qquad (4)$$

At low frequencies, when $R^2 >> \omega^2L^2$ and G is effectively zero, the loss is closely approximated by:

$$\alpha \doteq \sqrt{\frac{R\omega C}{2}} \quad \text{nepers} \qquad (5)$$

It is apparent from Figure 5 that this condition prevails at the lower audio frequencies. When frequency, and thereby ω L, is increased, the ratio of conductor resistance and inductive reactance approaches unity and (5) is no longer applicable. The increased inductive reactance tends to retard the rise in attenuation. This effect, as it occurs in six pair #19 rural distribution wire between 4 and 40 KC is illustrated in Figure 5.

When the frequency is sufficiently high so that $\omega^2L^2 >> R^2$ and $\omega^2C^2 >> G^2$, but G is not negligible, equation (4) may be modified as follows:

$$\alpha \doteq \frac{R}{2}\sqrt{\frac{C}{L}} + \frac{G}{2}\sqrt{\frac{L}{C}} \quad \text{nepers} \qquad (6)$$

In this range the inductance and capacitance remain comparatively constant, hence the total attenuation is the sum of the losses associated with resistance and conductance. At high frequency, the line resistance is a function of the square root of the frequency, and conductance

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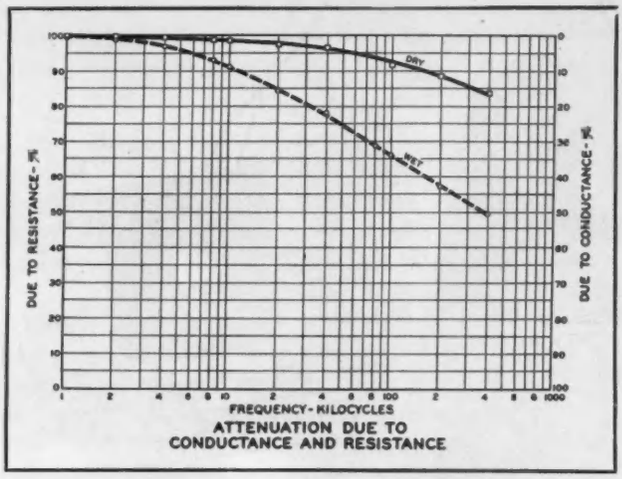

Figure 6:—Rural Distribution Wire 6 Pair #19.

is approximately proportional to the frequency. Consequently, the attenuation attributed to these line constants is similarly affected and increasing importance will be attached to the conductance as the frequency is raised. At very high frequency, the attenuation derived from conductance predominates. For rural distribution wire the practical significance can be found in *Figure* 6. The effect of a greater G during wet weather may also be observed from these curves.

When wet, the attenuation of rural distribution wire rises substantially and is nearly doubled at 400 KC. Some variations will be found in this value, however, dependent upon the amount of water confined to the interstices of the line. Ice or snow would provide still another variable affecting the magnitude. The attenuation values for various wires are given in *Figure* 5. Losses in paper insulated 19 DNB (.066 mf/mile) exchange area cable are noted to be very close to those for dry six pair #19 rural distribution wire .

(B) Phase Shift:—The phase shift, or retardation angle, in radians per unit length is, by definition, the imaginary part of the complex propagation constant.

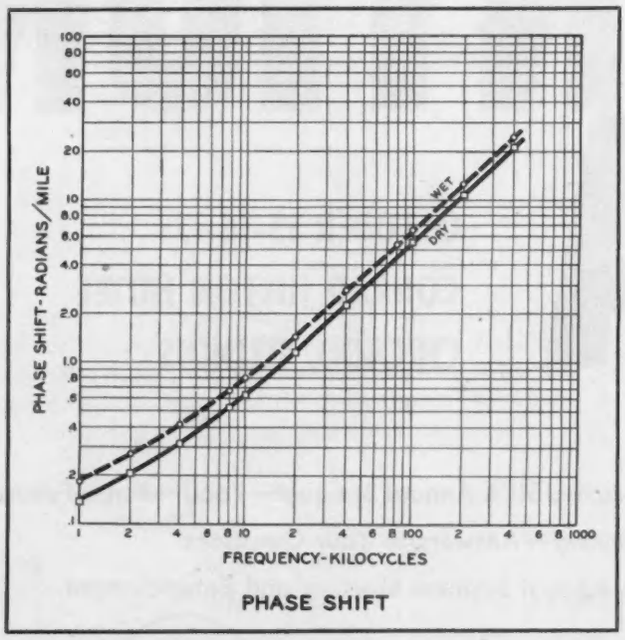

Figure 7:—Rural Distribution Wire 6 Pair #19.

Whenever the frequency is sufficiently high so that $R << \omega L$ and $G << \omega C$ the phase shift constant may be closely approximated by:

$$\beta \doteq \omega\sqrt{LC} \qquad \text{radians} \tag{7}$$

Inasmuch as the inductance and capacitance remain essentially constant, it is apparent that phase shift varies directly with frequency. Figure 7 shows this to be true for 19 gage rural distribution wire above 20 kilocycles.

When it may be assumed the $R >> \omega L$ and that $G << \omega C$, the phase constant becomes

$$\beta \doteq \sqrt{\frac{R\omega C}{2}} \qquad \text{radians} \tag{8}$$

and a function of the square root of the frequency. Also, since C decreases somewhat in this range, the phase shift will react in the manner described by the curve in Figure 7 below 20 kilocycles. The greater retardation angle during wet weather is attributed to an increase in the capacitance.

(C) Velocity of Propagation:—The rate at which a wave travels along a transmission line may be stated mathematically as:

$$V = \lambda f \tag{9}$$

where

$$\lambda = \frac{2\pi}{\beta} \tag{10}$$

substituting (10) in (9)

$$V = \frac{2\pi f}{\beta} \tag{11}$$

The wave is propagated much more slowly than the speed of light at the lower frequencies. However when

$$\beta \doteq \omega\sqrt{LC} \qquad \text{radians} \tag{7}$$

equation (11) reduces to

$$V \doteq \frac{1}{\sqrt{LC}} \tag{12}$$

In this range the velocity is dependent only upon the materials and physical dimensions of the line, and approaches a constant value considerably closer to the speed of light. Curves of velocity vs. frequency are shown in *Figure* 8.

(D) Characteristic Impedance:—The input impedance for a uniform line of infinite length is referred to as the characteristic impedance. In order to avoid reflection, and the resultant standing waves, the line must be terminated in an equivalent value. The rigorous equation for characteristic impedance in terms of the primary constants is:

$$Z_o \doteq \sqrt{\frac{R + j\omega L}{G + j\omega C}} \qquad \text{ohms} \tag{13}$$

Since L and G are usually negligible at low frequencies, the impedance will contain a reactive term. Ob-

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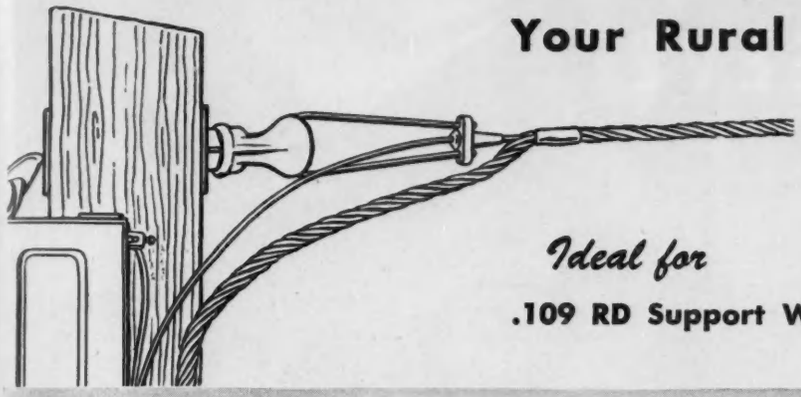

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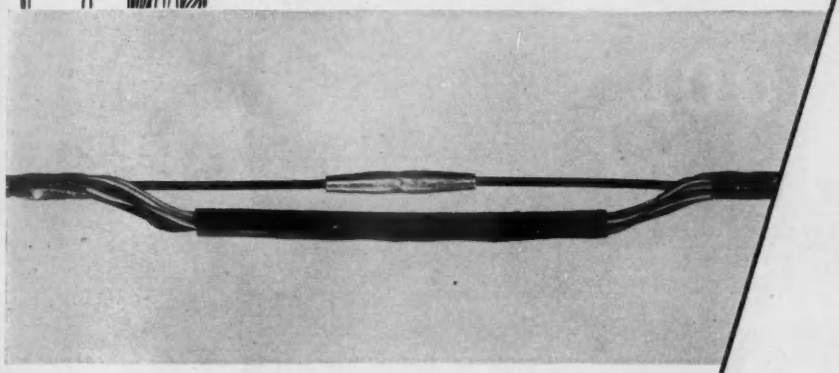

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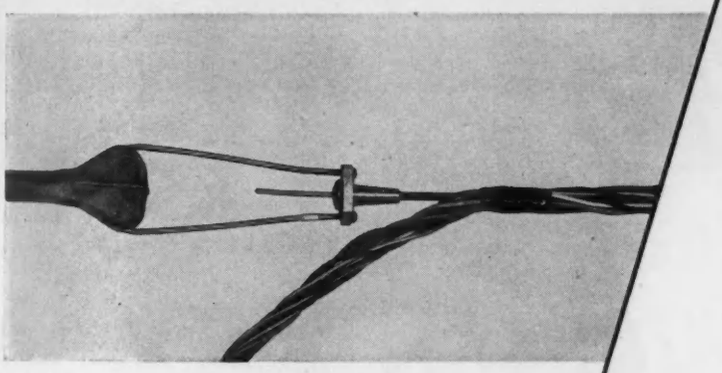

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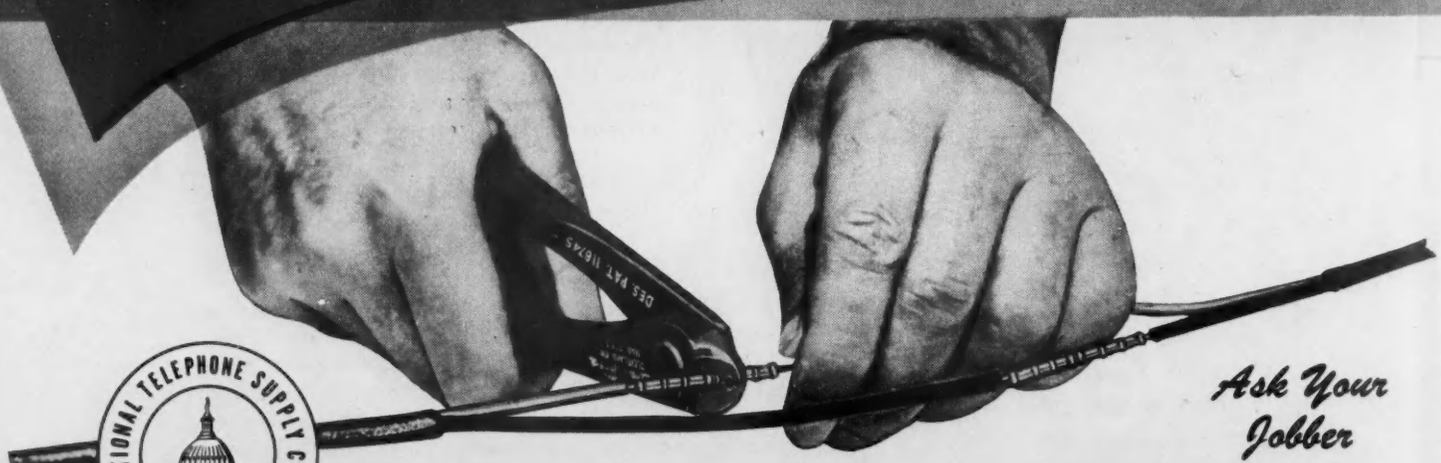

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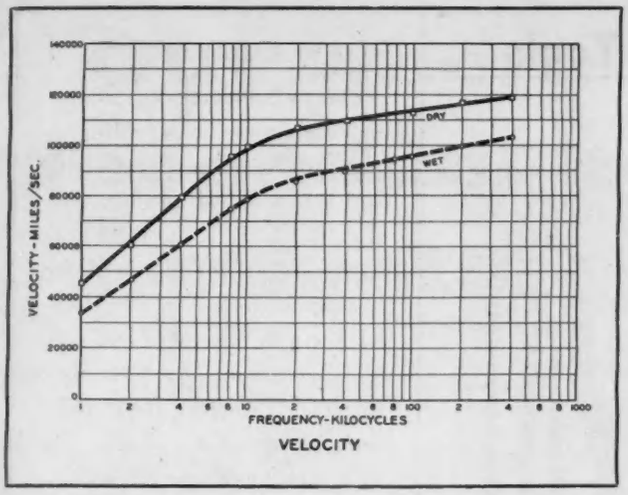

Figure 8:—Rural Distribution Wire 6 Pair #19

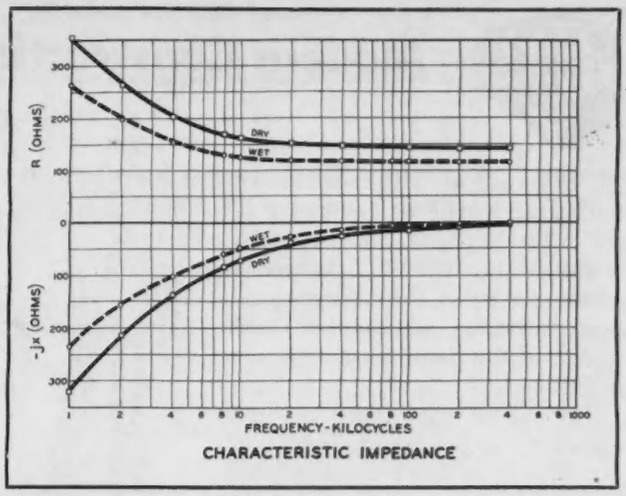

Figure 9:—Rural Distribution Wire 6 Pair #19.

viously, the magnitude of the characteristic impedance decreases with increasing frequency.

Formula (13) can be further modified if $\omega L >> R$ and $\omega C >> G$. Then

$$Z_o \doteq \sqrt{\frac{L}{C}} \quad \text{ohms} \qquad (14)$$

Thus, at high frequency, the characteristic impedance is nearly a pure resistance and nearly independent of the operating frequency. The measured data shown in Figure 9 depict the conditions described above.

Summary

AN EFFORT has been made to correlate the theoretical electrical behavior of rural distribution wire and the actual measured characteristics. Primary and secondary constants, representative of the wire during both dry and wet weather, are presented.

The transmission characteristics of rural distribution wire generally are more closely related to the 19 gage paper insulated cable than to the present open wire systems.

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APPENDIX ONE
Calulation of Primary and Secondary Line Constants

$$Z_{oc} = Z_o \coth \gamma x \qquad (1)$$

$$Z_{sc} = Z_o \tanh \gamma x \qquad (2)$$

where:

Z_{oc} = open-circuit impedance
Z_{sc} = short-circuit impedance
Z_o = characteristic impedance
γ = propagation constant
x = length of line

It follows then that,

$$Z_o = \sqrt{Z_{oc}\, Z_{sc}} \qquad (3)$$

$$\gamma x = \tanh^{-1} \sqrt{\frac{Z_{sc}}{Z_{oc}}} \qquad (4)$$

The attenuation constant (α) and phase shift (β) are the real and imaginary parts respectively of the propagation constant.

$$\gamma = \alpha + j\beta \qquad (5)$$

The primary constants of the line, resistance (R), inductance (L), capacitance (C) and conductance (G) can be determined by the following relationships.

$$Z = Z_o \gamma = R + j\omega L \qquad (6)$$

$$Y = \frac{Z_o}{\gamma} = G + j\omega C \qquad (7)$$

Editor's Note: This paper was presented by Mr. Brazee, of the Whitney Blake Co., at the Fourth Annual Symposium on Technical Progress in Communications Wire and Cables, sponsored by the Signal Corps Engineering Laboratories.

Modern Construction Tools

(Continued From Page 53)

"A" is turned to "UP" position. Operating the handle up and down will pull or lift the object. The trigger "A" is shifted to "DOWN" position to release or lower the object by the same operation of handle. Larger models of the chain hoist are shown in *Figure* 19.

The one-ton chain hoist shown in *Figure* 20 is a newly introduced product. This hoist has a balanced easy-grip handle that operates from either side as required and features a "free-wheeling" arrangement for pulling up the chain to the load. An automatic locking control prevents accidental dropping of the load. It also has a half-link and full link take-up for accurate control and speed. Where desired, a safety latch can be provided without the need to remove heavy gloves. *Figure* 21 illustrates how the hoist is employed to pull up a guy being installed.

Only a 100-pound pull is required to lift 2,000 pounds, a 20 to 1 lever-

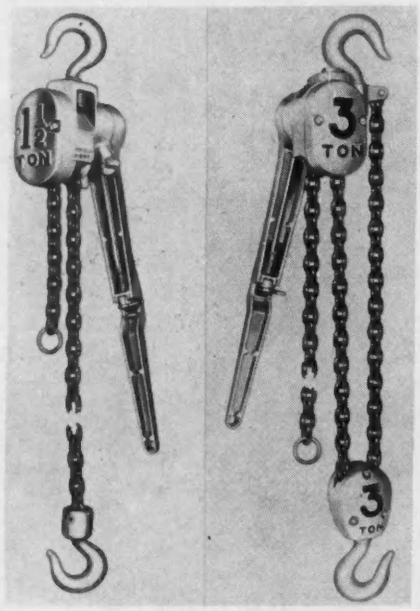

FIG. 19:—1-1/2-ton and 3-ton hoists for heavier loads.

ing advantage. The hoist is also available with a load indicator as shown in *Figure* 22 which tells the lineman when load capacity of the hoist has been reached, preventing damage to the hoist and possible injury to the workman. This load indicator can

Please turn to page 80

CREDITS

The author thanks the following companies for providing illustrations used in this article: *Fig.* 1, 6, 8, *W. M. Bashlin Co.; Fig's.* 2, 4, 5, 7, 9, 14, *Buckingham Mfg. Co.; Fig.* 3, *Miller Equipment Co.; Fig.* 10, *Mathias Klein & Sons; Fig's* 13, 30, 31, 32, *Greenlee Tool Co.; Fig's* 15, 16, 17, *Coffing Hoist Div., Duff-Norton Co.; Fig's* 18, 19, *Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Fig's* 20, 21, 22, *A. B. Chance Co.; Fig's* 23, 24, 25, 26, *Homelite Corp., Fig.* 27, *Southworth; Fig's* 28, 29, *The Henry Co.*

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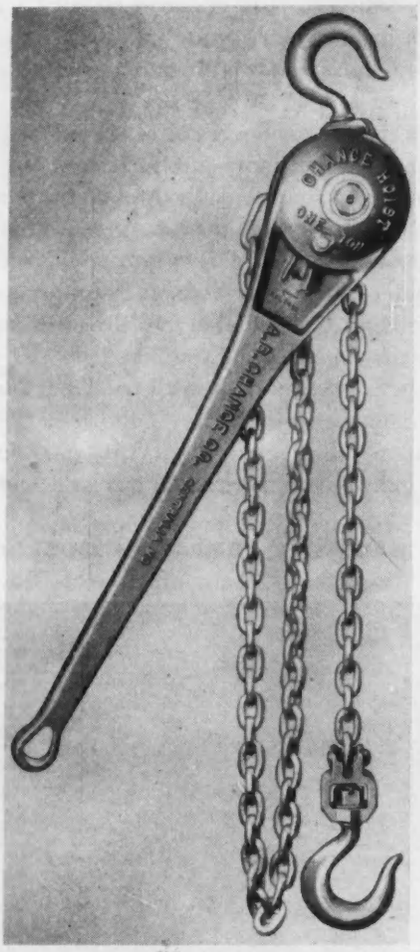
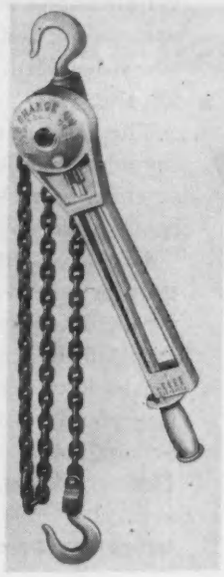


FIG. 20:—One-ton hoist featuring ratchet type handle and simple controls for "free-wheeling" of chain and direction of chain operation.



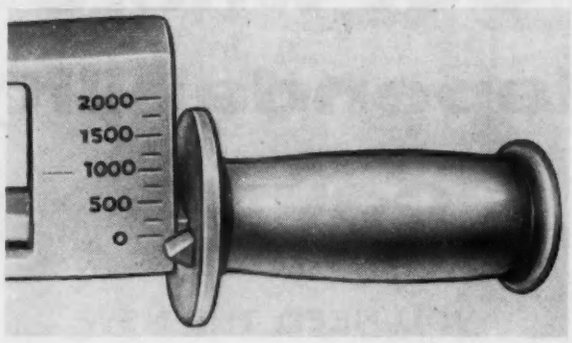


FIG. 22:—One-ton hoist with load indicator. Scale is graduated to read in 250 pound increments up to 2,000 pounds. This indicator has provision for recalibration in the field, should this be necessary. Insert shows enlarged view of indicator.

also be used to measure the approximate tension of the guy or messenger being pulled up.

Tools Used in Tree Clearance Work

IN MANY parts of the country, tree clearance is an extremely difficult and expensive job for telephone companies on account of excessive growth along right of ways for open wire leads. The introduction of modern tools and methods have reduced the work required to properly clear these right of ways. In *Figures* 23 to 29 are illustrated power operated tools that are very useful in tree clearance work.

Power chain saws have greatly re-

FIG. 21:—Showing lineman using hoist in pulling up a guy being installed.

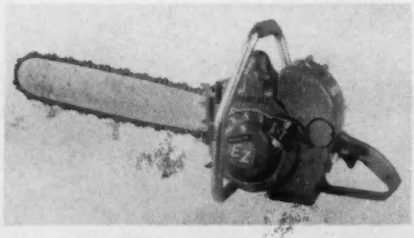


FIG. 23:—Chain saw with 5-horsepower engine.

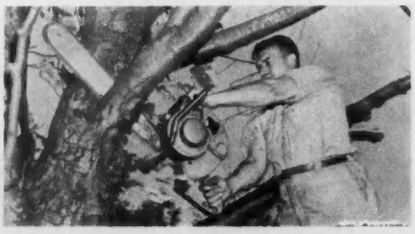


FIG. 25:—Looping tree limbs with chain saw.

FIG. 24:—Cutting down large tree with chain saw.

FIG. 26:—Clearing attachment provides jaw-grip spike for plunge bucking.

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duced the tedious work of cutting down trees and bucking trunks and limbs to suitable lengths that can be handled for disposition. These saws are of electric or gasoline-engine power driven types. Gasoline powered saws are proving to be popular with the telephone men as they eliminate the need for transporting a separate portable generator in the maintenance truck. With them, trimming and clearing can be done in less time with much less effort and at a surprisingly low cost. Electric chain saws, however, are quite convenient to use when working in trees and the saw must be taken up in the trees for removing branches and limbs.

Figure 23 illustrates a gasoline-engine driven chain saw. This unit has a 5 HP engine, yet weighs only 19 pounds. With this extremely light and efficient saw, it is claimed that one man can cut as much wood in one hour as two men with a hand saw can handle in one day.

In *Figure* 24 is shown how this 5 HP gasoline powered saw brings down trees up to three feet in diameter. This saw will cut through an 8-inch oak in five seconds, and 18-inch pine in 14 seconds. It is also possible to take up a light-weight gasoline-engined powered saw into a tree to cut off limbs as depicted in *Figure* 25.

For felling and bucking smaller trees and saplings, a clearing attachment is available for use with a standard chain saw as shown in *Figure* 26. This is an attachment that converts a regular chain saw to make possible plunge-bucking in which the forward end of the saw does the cutting as well as the rear end. As the

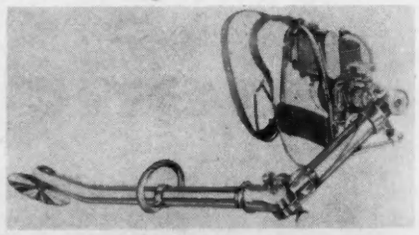

FIG: 27:—Top — Brush cutter. Bottom — Showing portability, hands-free feature for balanced carrying of brush cutter.

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illustration shows, these tools make it unnecessary to squat or stoop to bring the saw to the work.

A power saw designed for brush cutting work is illustrated in *Figure* 27. This tool will easily cut anything from fine weeds up to 12-inch trees, and is claimed to do more work than six men using brush hooks or scythes. It has a 2.8 HP motor belt for continuous operation and comfortable fit on the operator's back, out of the way and relieves strain on the operator's arms. With it, the operator has a firm footing, extra mobility, and the use of both hands. One hand can be used for clearing and the operator can stand in an erect position in cutting. since the saw can be tilted up and down or in any direction. This versatile tool can be swung around in a wide arc like a scythe and can be employed in overhead work. Small trees up to 12 inches in diameter can be cut by notching. The power saw is quite handy for trimming off branches on felled trees.

The use of compressed-air power-driven tree trimmers has greatly speeded the work of clearing tree branches and limbs away from contact with telephone wires, particularly when dense growths are encountered. The power trimmer illustrated in *Figure* 28 features simplicity of design. Air is used only on the cutting stroke

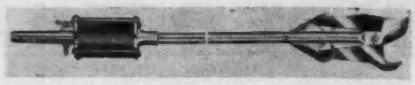


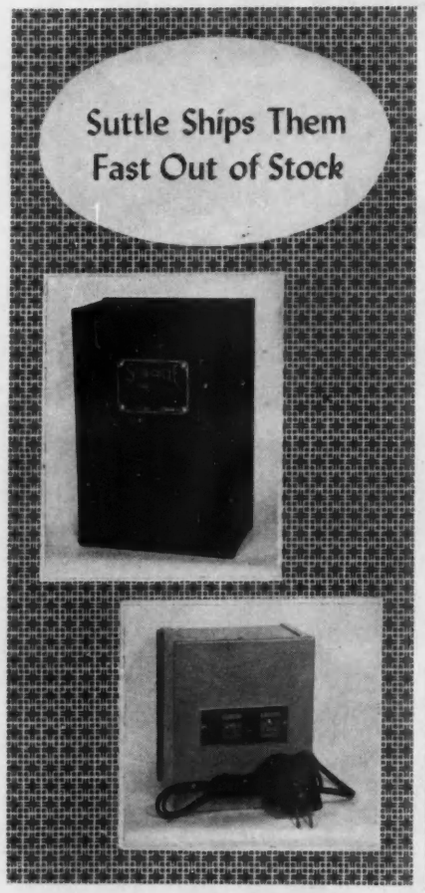
FIG. 28:—General purpose power pruner for line clearance work.

with a spring operating the return stroke. This results in low air consumption and enables the use of inexpensive, easily portable compressors. It is stated that the simple design and mechanism eliminates mechanical trouble and break down. Where necessary, parts are easily replaced in the field.

This tool operates by the plunge-cut action. No hooking of limbs is required. It is only necessary to thrust the cutter against the branch and push the trigger to operate the cutting blade.

Small compressors provide ample power for operating this compressed-air driven tree trimmer. For the model shown in *Figures* 28 and 29 a compressor providing up to 125 to 150 pounds of air pressure will enable it to cut 2-inch hard wood with low air consumption. *Figure* 29 illustrates two men using air driven power pruners to trim trees along a right of way. The illustration also shows a "brush chipper" in operation. This tool saves much time and effort in disposing of brush accumulated from tree trimming operation. (*To be concluded in the next issue.*)

FIG. 29:—Power pruners being used in trimming extensive growths along right of way. Brush chipper in foreground is a highly useful means of brush disposal.



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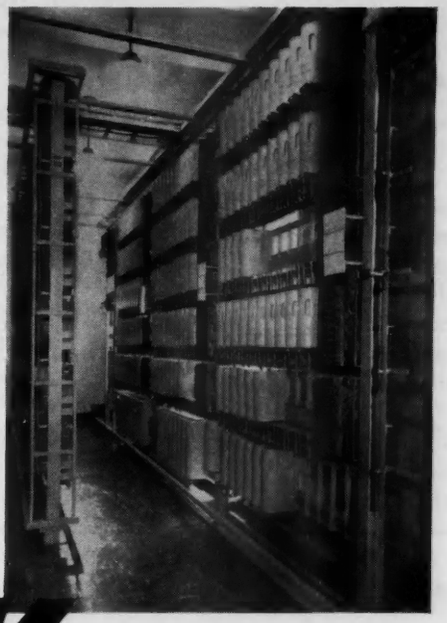

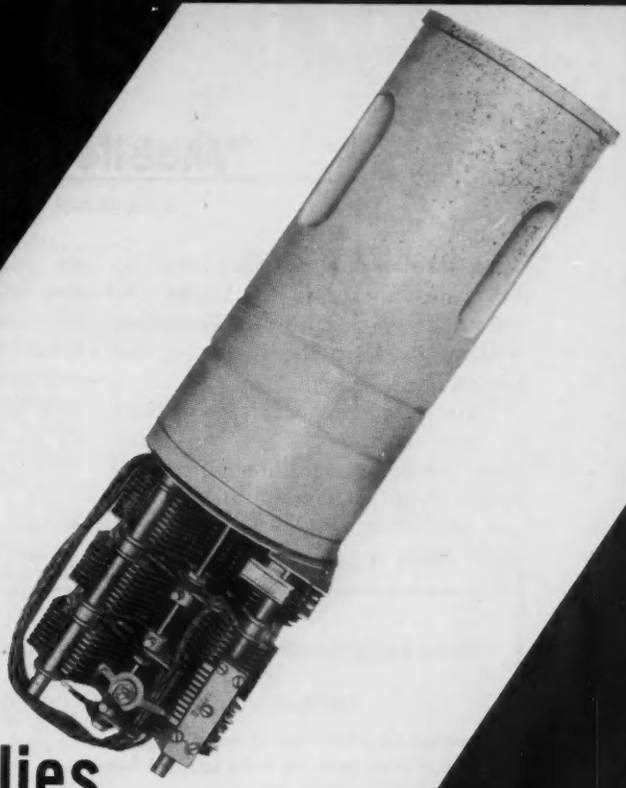

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(Continued from page 58)

hooks are so designed that they can be turned inward so the ladder can be withdrawn from the other section without catching the hooks on the rungs.

This type of ladder is convenient to use; however, there are many cases where low-roof houses, such as ranch type residences prevent the use of 12-ft ladder sections. In such cases, it is desirable to also carry a 10-ft. single ladder which can be easily removed from the rack and employed as needed. It will be found that ladders of this length are the most frequently used. The 4-ft. step ladder would be found especially convenient for installation work in houses.

On trucks having sloping tool and ladder rack with the ladder mounted at one side (curb), there is an arrangement that enables the ladder to be placed on or removed from the truck with a minimum of effort and

CREDITS

THE AUTHOR thanks the following companies for providing illustrations for this article: *Fig's* 1, 2, 3, 4, 5, *McCabe Powers Auto Body Co.*; *Fig's* 6, 7, 8, *Stahl Metal Products, Inc.*; *Fig's* 9, 10, *York-Hoover Corp.*; *Fig's* 11, 12, *Highway Trailer Co.*

Table 1 (Continued)—Suggested Maximum Quantities of Materials Carried on Combinationman's Truck

MATERIAL	QUANTITY
Receivers for each type of subset carried	1
Rings, Rubber Base for Self-Contained Sets	4
Rings, 5/8" (Style E) Bridle	12
Rings, 1 1/4" (Style C) Bridle	6
Rings, 1 5/8" (Style A) Bridle	2
Rings, 1 1/4" Toggle Bridle	2
Rings, 5/8" Drive	25
Screws, 1/4" x 2" Fetter Drive	12
Screws, 5/16" Angle	6
Screws, 5/16" x 3" Drive	1
Screws, 1/2" x 4 1/2" Drive	2
Screws, Galvanized Wood, 3/8" x #6 RH)	15
Screws, Galvanized Wood, 1/2" x #6) in envelope	15
Screws, Galvanized Wood, 3/4" x #6)	15
Screws, Galvanized Wood, 1 3/4" x #6 RH	15
Screws, Galvanized Wood, 1/2" x #8 RH	25
Screws, Galvanized Wood, 3/4" x #8 RH	50
Screws, Galvanized Wood, 1" x #8 RH	25
Screws, Galvanized Wood, 1 1/4" x #8 RH	25
Screws, Galvanized Wood, 1 1/2" x #8 RH	25
Screws, Galvanized Wood, 2" x #8 RH	25
Screws, Galvanized Wood, 2 1/2" x #8 RH	25
Screws, Galvanized Wood, 2" x #10 RH	25
Screws, Galvanized Wood, 2 1/2" x #10 RH	25
Screws, Galvanized Wood, 3" x #10 RH	25
Screws, Galvanized Wood, 1 1/2" x #10 FH	25
Screws, Galvanized Wood, 1" x #14 RH	25
Screws, Galvanized Wood, 1 1/2" x #14 RH	25
Screws, Galvanized Wood, 2" x #14 RH	25
Screws, Galvanized Wood, 2 1/2" x #14 RH	25
Screws, Galvanized Wood, 3" x #14 RH	25
Screws, Galvanized Wood, 1 1/4" x #14 FH	25
Screws, Galvanized Wood, 1 3/4" x #14 FH	25
Screws, Galvanized Wood, 2 1/2" x #14 FH	25
Screws, Galvanized Wood, 3" x #14 FH	25
Screws, Galvanized Wood, 3 1/2" x #14 FH	25
Screws, Galvanized Wood, 2" x #18 FH	25
Screws, Galvanized Wood, 2 1/2" x #18 FH	25
Screws, Self Tapping, 1/2" X #5	15
Screws, Self Tapping, 3/4" X #8	25
Screws, Self Tapping, 1-1/4" X #8	25
Screws, Self Tapping, 1-3/4 X #10	25
Screws, F.H. Machine, 1/2" X 6-32	6
Screws, F.H. Machine, 1-1/4" X 6-32	6
Screw Eyes, Insulated, 5/8" Short Shank	6
Screw Eyes, Insulated, 1" Short Shank	6
Screw Eyes, Insulated, 5/8" Long Shank	2
Screw Eyes, Insulated, 1" Long Shank	2
Shields, Lead, 2" X 3"	5

MATERIAL	QUANTITY
Sleeves, Compression, inside wire	50
Sleeves, Compression, drop straight	50
Sleeves, Compression, drop tap	6
Sleeves, Compression, #14 jumper	25
Sleeves, Compression, 104 copper	25
Sleeves, Compression, #14 ground	15
Sleeves, Compression, 104 to 104	12
Sleeves, Compression, 104 to drop	6
Sleeves, Compression, 104 to #14 tap	12
Sleeves, Compression, 104 deadend	12
Sleeves, Compression, 109 steel	25
Sleeves, Compression, 109 to 109	12
Sleeves, Compression, 109 to drop	25
Sleeves, Compression, 109 to #14 tap	12
Sleeves, Compression, 109 deadend	25
Sleeves, Spinner Wire, 091	15
Staples, 1-1/2" Galvanized Guy	12
Staples, #1 Insulated	200
Staple Nails, Ground Wire	1/2 lb.
Steps, Iron Pole	2
Steps, Detachable Pole, Lag and Plate	1
Steps, Wood Butt Block	2
Strand #2200	50 ft.
Subsets, Magneto	2
Subsets, DHS (Dial or Common Battery Equivalent)	4
Subsets, WHS (Dial or Common Battery Equivalent)	2
Subsets, DHS—Rural (Dial or Com. Batt. Equivalent)	1
Subsets, WHS—Rural (Dial or Com. Batt. Equivalent)	1
Tape, 3/4" Friction (Roll)	1
Tape, 3/4" Rubber (Roll)	1
Tie Wires, 2# Bundle (Iron)	1
Transmitter, for each make of transmitter	1
Tubes, 5/16" X 3" Porcelain	10
Tubes, 5/8" X 4" Porcelain	1
Washers, 7/16" X 1" Round	12
Washers, 9/16" X 1-3/8" Round	6
Washers, Square 3/4" X 2-1/4"	3
Wire, #14 Ground	100′
Wire, #18 Paired Bridle	250′
Wire, #18 Parallel Drop	1000′
Wire, #20 Triple Bridle	250′
Wire, #22 Triple Brown	250′
Wire, #22 Triple Ivory	250′
Wire, #22 Paired Brown	250′
Wire, FX Jumper	100′
Wire, #109 Steel (10# coil)	300′

Table II — Suggested List of Tools for Combinationman's Truck

TOOLS	QUANTITY	TOOLS	QUANTITY
Angle Screw Tool (to turn angle screws used with "C" knobs)	1	Hammer, Claw	1
Axe, Chopping	1	Hammer, Striking	1
Bags, Telephone Instrument	8	Hammer, Tack	1
Bit, Wood, 3/8" X 8"	1	Handline, 50 ft. cord	1
Bit, Wood, 1/2" X 8"	1	Instrument, Volt-Ohmmeter	1
Bit, Wood, 5/8" X 12"	1	Knob Screw Driver	1
Bit, Wood, 13/16" X 12"	1	Ladder, 24 ft. Extension	1
Bit, Wood, Extension	1	Ladder, 10 ft. Single	1
Bit, Bell Hanger, 1/4" X 18"	1	Ladder, 4 ft. Step	1
Bit, Bell Hanger, 3/8" X 18"	1	Maps, Rural Plant Record	1 Set
Bit, Bell Hanger, 5/8" X 18"	1	Sleeve Pressing Tool (for line wire sleeves)	1
Body Belt and Safety	1	Pike Pole Test Point	1
Brace, Corner	1	Saw, Docking	1
Brace, Ratchet	1	Set: Accounting Handbook	1
Bucket, Canvas	1	Instructions Handbook	1
Case, Tool and Material Carrying	1	Safety Code Handbook	1
Climbers - Pair	1	Shovel, Digging	1
Clearance Measuring Line	1	Shovel, Trench or Tile	1
Drills, Sebeco, Set	1	Slack Blocks	2
Drill, Star, 1/2"	1	Slitter, Drop Wire	1
Drill, Star, 5/8"	1	Soldering Iron (small 35-watt)	1
Drill, Star, 3/4"	1	Stencil Brush (Terminal)	1
Drill, Star, 7/8"	1	Tamp	1
Drill, Push	1	Tape, 100 ft.	1
First Aid Kit	1	Test Set, Dial	1
Fish Tape	1	Test Set, Installers Tone	1
Flags - Warning on Truck	1	Test Set, West	1
Flashlight	1	Transposition Jumpers	2
Files - 10" Flat	1	Trimmer, Tree with extension handle	1
Gloves, Rubber (In Bag)	1	Trimmer, Tree Saw with extension handle	1
Goggles, Safety	1	Wire Polishers	4
Hacksaw, with blade	1	Wrench, Lag	1

with little danger from vehicular traffic.

In this feature, a long side rail extends over the cab at the side of the truck and the far end of this rail has a fulcrum pin. The top end of the ladder is placed against the fulcrum pin and the bottom end is then lifted onto the rack and shoved into place underneath the clamps. Operating a clamp device on the rack holds the ladder down and prevents its movement during the travel of the truck. Such an arrangement is shown in *Figure* 9.

Servicing the Trucks

IN THE larger telephone companies where garage personnel is hired, and a place is provided where all servicing work can be performed by the personnel, much can be accomplished by these people in maintaining automotive equipment, including combinationmen's trucks. The usual work of garage personnel consists of gassing, oiling, greasing, filling radiators and batteries, inflating tires,

Please turn to page 90

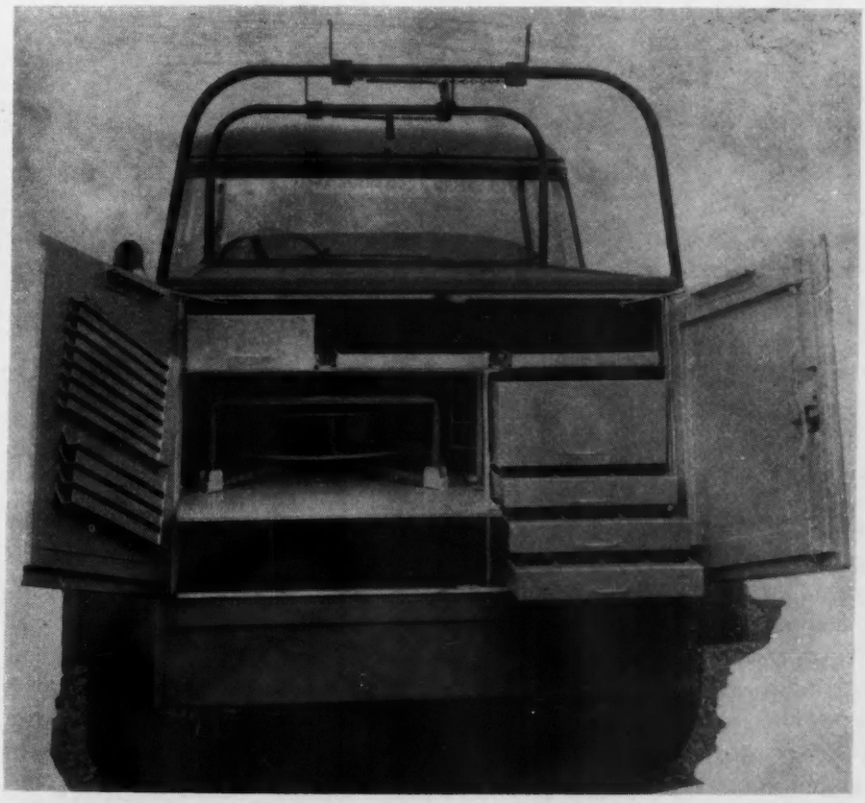


FIG. 8:—Telephone service body. View of rear compartment which is conveniently arranged to place all tools and equipment within easy reach. Drop wire reel or sliding shelf. Space at lower left for short step ladder.

construction and maintenance DIGEST

- Keep batteries young
- Happy anniversary
- These two
- Real cool sitting
- 25-year battery
- A lineman's vise
- In the (sq.) groove
- Supersonic splice
- Wires' Shangri-la
- Pennies for power

Published every month to help you get the most out of your materials and supplies dollar

by C. J. Reynolds, Stromberg-Carlson Company

Two dividends are yours when you order supplies from Stromberg-Carlson. First, you get the protection of a double guarantee—ours and the maker's. This assures you of getting the finest products, backed by our 62-year reputation. Second, your support is used to further the art of telephony. We're knee-deep in this industry as a full-time job, not a side line, and your supply business plays a big part and helps us continue our research for new and better telephone equipment.

How to stretch out the useful life of your batteries

Keep your batteries charged at just the right level, and they'll give you added years of service.

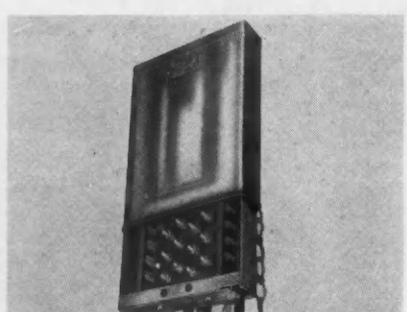
You can maintain the right charge automatically, with the new Raytheon "high-rate" RectiChargeRs .

This constant potential battery charger, like all Raytheon RectiChargeRs, operates 100% automatically. It has special dry disc rectifiers plus an exclusive Raytheon Magnetic Amplifier Control Circuit which maintains precise DC voltage output at any load in the presence of wide changes in AC input voltage . . . increases battery life by eliminating over- and under-charging.

It handles inexpensively all normal power requirements and allows the battery to "stand by" fully charged to meet all emergency demands. You get noiseless current at constant voltage by simple connections to a power outlet and your battery.

The Silver Anniversary Terminal

Time Tested, Time Proved. Yes, the past 25 years of experience has proved the Cook XB Cable Terminal is the best of its kind.



Unprotected XB Cable Terminals, available in 6-, 11-, 16-, and 26-pair sizes, with or without stub.

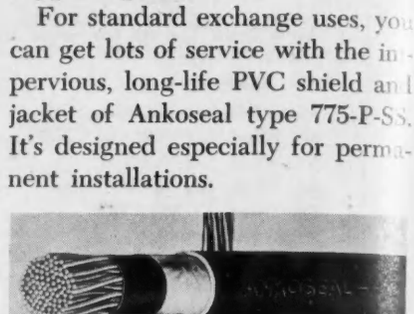
The features are: A patented Bakelite faceplate and fanning strips moulded in one piece; non-corroding everdur studs that cannot twist or turn; sturdy, reversible zinc hood for taking stub out top or bottom; patented weather guards at the drop wire opening, all combine to make this unit the outstanding unprotected terminal on the market.

Hundreds of thousands of XB Terminals in use today attest to their dependability.

Choose from these 2 self-supporting cables

Yes, you do have a choice in self-supporting cables!

For standard exchange uses, you can get lots of service with the impervious, long-life PVC shield and jacket of Ankoseal type 775-P-SS. It's designed especially for permanent installations.



Exchange cable (top) and rural distribution wire are both easy to install.

And for temporary service, you can't beat the speed and low-cost installation of Ankoseal Rural Distribution Wire. Individual color-coded conductors, insulated with polyethylene with a PVC covering, are cabled around an insulated extra high strength galvanized steel support wire. There is no shield or jacket.

There's an Ankoseal self-supporting cable to meet each situation.

Cane-seat chair keeps operators cool, comfortable

Making the operator as comfortable as possible may not strike you as a "maintenance" problem – yet your service is much smoother when the girls are cool and relaxed.

This operator's chair has a cane seat, which is much cooler, cleaner and more comfortable than other types. It retains all the posture advantages for which Sturgis is famed. It is called the Sturgis SC-240.

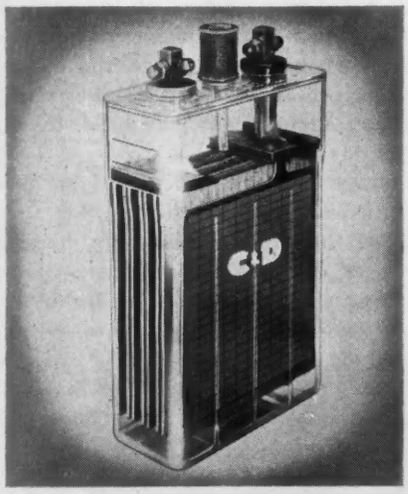
The posture-curved, well-cushioned backrest is covered in genuine leather.

The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.

Other new and welcome features include a plastic-coated steel foot ring which retains its color, and a handy purse holder, available on request. Six seat heights, all adjustable.

Battery will live 25 years

A quarter of a century is the expectancy of an extra-life battery made by C & D Batteries, Inc. In full-float service, their PlastiCal (lead calcium grids) battery will serve your power needs faithfully—often well beyond its 25-year expectancy.



It'll be 1979 before you even have to *think* about replacing this extra-life C & D battery, if you install it now!

C & D Batteries' PlastiCell (high tensile, special alloy grids) battery offers reliable power supply at lower cost, with a life expectancy of 14 years.

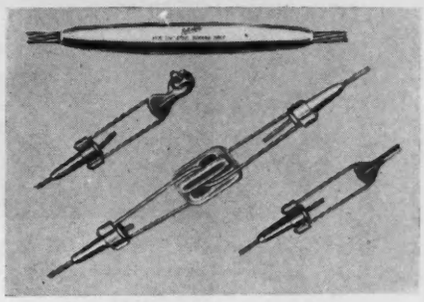
Strandlink and Strandvise—stronger than steel strand itself

Now you can splice steel strand easily, and have a splice that is at least as strong as the strand itself.

You need no tools to use the Strandlink (automatic-type splice). It has holding jaws of several hundred case-hardened steel teeth that bite firmly into the strand when you pull, but allow you to push the strand in easily by hand.

Another valuable aid for the lineman is the Strandvise—automatic-type deadend which applies the same principle as the Strandlink to give you a vise-like grip that is stronger than the strand.

Both Strandlink and Strandvise will hold steel strand in **any grade,**



Strandlink—splice needs no tools. Several applications of Strandvise.

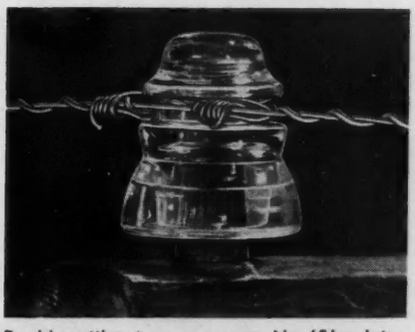
to its ultimate strength. Available 3/16" through 7/16" strand size—with short or long, and range of bail types.

Also available: Strandlink reducers, 3/8"–5/16" and 7/16"–3/8".

For fast, permanent splices and deadends, ask your Stromberg-Carlson representative about Strandlink and Strandvise.

Use this insulator for rugged line construction

Hemingray Number 45 insulators with their square groove provide the ideal slot for your wire. Their reinforced construction under the groove reduces the possibility of breakage of the flange under the most severe ice loading conditions.



Double petticoat, square groove No. 45 insulator.

The extra long leakage path and double petticoat will reduce line losses and insure the strongest signal possible. These insulators are highly recommended for use on dial circuits where the strongest possible signal is necessary.

Hemingray insulators, the "World standard since 1870," are made by Kimble Glass Company, subsidiary of Owens-Illinois.

High-speed splice outlasts the wire itself

You can cut half the time off splicing wires—and get a splice that will actually outlast the conductor itself!

Available for all types of wire: Nicopress sleeves. Special Nicopress tool is easy to use.

Because it is stronger than the rated breaking strength of the wire, you just can't pull apart a joint made with the Nicopress sleeve. It will withstand the toughest strains of vibration, yet makes a neat, compact splice that you can use on drop or inside wires as well as other lines. A tough inner alloy lining—harder than either the sleeve or the conductor—is the secret of Nicopress sleeves' strong grip.

To apply Nicopress sleeves quickly and simply, use the Nicopress tool, which is specifically designed to work together with the sleeves for high-speed splicing.

Here's a drop wire that hides its age

Samples of Teleprene® (neoprene jacketed) drop wires were strung where they would get lots of weather. After nine years, they still looked fresh and undaunted—and tests showed that these wires would give years and years **more** of good service!

The jacket is a tire-tread type neoprene compound which provides excellent resistance to sunlight, abrasion, oils, acid fumes, alkalies and other corrosive chemicals.

Conductors have Teleplate coating: lead, to resist corrosion, and brass plating over the lead, to provide enduring adherence of the

(Coutinued from Page 89)

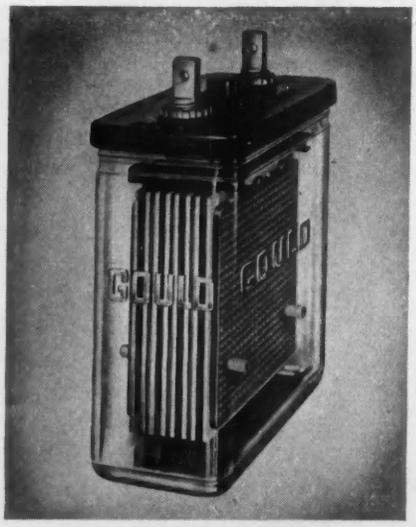
construction and maintenance digest

Available in parallel (shown here), twin parallel and twisted pair types.

high quality buna rubber insulation to the conductor.

Battery has lowest yearly cost

There's an easy way to save money on switchgear, signal and alarm systems or emergency light and power applications.



Gould Planté rolls up excellent service records—cuts maintenance to a minimum.

Amazing service records have proved that Gould Planté batteries have the lowest yearly cost of any battery you can use. Pure lead positive plates help make this possible.

For top operating economy, ask your Stromberg-Carlson representative for Gould Planté—the Aristocrat of Stationary Batteries.

Distributed by

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FIG. 9:—Right side view of service body showing convenient material and tool compartment. Note side ladder rail with fulcrum pin.

washing, cleaning and polishing, touching up work or chipped places in automobile finish and making minor adjustments.

Minor adjustments are quite important in maintaining the proper operation of automobile engines. Such adjustments are called "tune-up" or "preventive maintenance." It usually consists of adjusting carburetors, tightning fan belts, cleaning spark plugs, adjusting brakes and many others. This work maintains the vehicles in a safe operating condition and makes them easier to drive. It is an important means of postponing the day when more substantial repairs would be necessary. That is the vital point of automobile preventive maintenance.

The driver also plays an important part in the preventive maintenance of his vehicle. The driver is the only one besides the garage personnel who knows the condition of the various parts of the motor vehicle. He is the one who is aware when the motor, clutch, brakes, battery, and tires require attention. In the smaller towns, the driver takes his car to a local garage and may often perform certain work on his vehicle.

In the larger towns where the telephone company has a garage, a form is provided for recording the neces-

FIG. 10:—Service body illustrating latest type ladder bracket, adjustable partitional drawers, sliding drop wire reel holder.

sary information in regard to the condition of the motor vehicle and the driver gives this sheet to one of the garage personnel when he wants work done on his car to correct certain conditions. The garage people, usually the night personnel, correct these conditions while the motor vehicle is in the garage.

It should be standard rule that no driver should ever have to take his car out of the garage in the morning if it is in an unsafe condition or may later become unsafe. A good safety precaution is to require the drivers to check the lights, horn, windshield wiper, and brakes before he takes his car out of the garage in the morning.

FIG. 11:—Installer's unit.

Murphy Named Gen. Mgr., Missouri Telephone Co.

W. C. MURPHY has been named as the new general manager of the Missouri Telephone Co., Middle States Utilities Co., of Missouri and Andrew County Mutual Telephone Co., to replace the late C. W. Gottry.

D. A. Smith will be the division plant superintendent for the three companies. Smith will replace George King, recently transferred to Grinnell, Ia. J. O. Milligan has been named as division engineer to replace C. L. Cox, also now in Grinnell, Ia. J. N. Cox has been named district manager at Columbia, L. W. Barnthouse will remain as district manager at Macon and N. T. Cunningham will remain district supervisor at Columbia. Don Schumacher will remain as local manager.

Murphy has been affiliated with telephone companies for a number of years. Prior to joining Missouri Telephone Co., he was general manager of the Nebraska Continental Telephone Co., Columbus. Prior to that he was general manager of the Middle States Utilities and the Andrew County Mutual Telephone Co., which until recently had headquarters in Cameron, Mo.

Smith, the newly appointed plant superintendent, has been associated with the Iowa Continental Telephone Co., at Nevada, Ia., as district manager.

Milligan, newly appointed plant engineer, is now plant superintendent for the Middle States Utilities Co., of Missouri and the Andrew County Mutual Telephone Co., with headquarters at Cameron, Mo. He has been with the companies for the past 27 years.

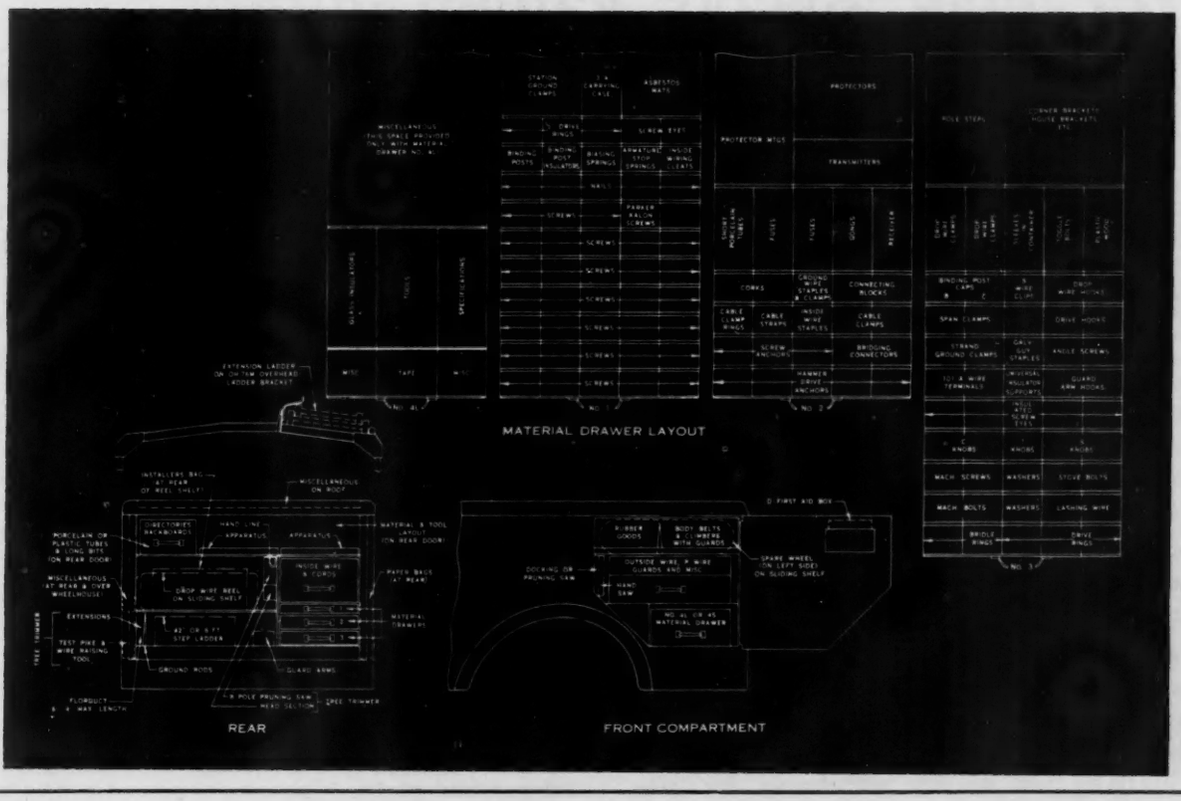


FIG. 12:—Material and tool layout for installer's unit.

Max E. Wettstein has been President and General Manager of the Florida Telephone Corporation since 1953. His 25 years of active service with the Company in varying capacities makes him well qualified to serve as its chief executive officer. Mr. Wettstein's thoughts about Graybar are presented below.

"We have always valued highly our relationship with Graybar"

The growth of the Florida Telephone Corporation in the past ten years has been extensive. Total telephones in service have increased from about 9,000 to nearly 30,000 and now, a continuing major project is even greater expansion to keep up with subscriber needs in this fast-growing State.

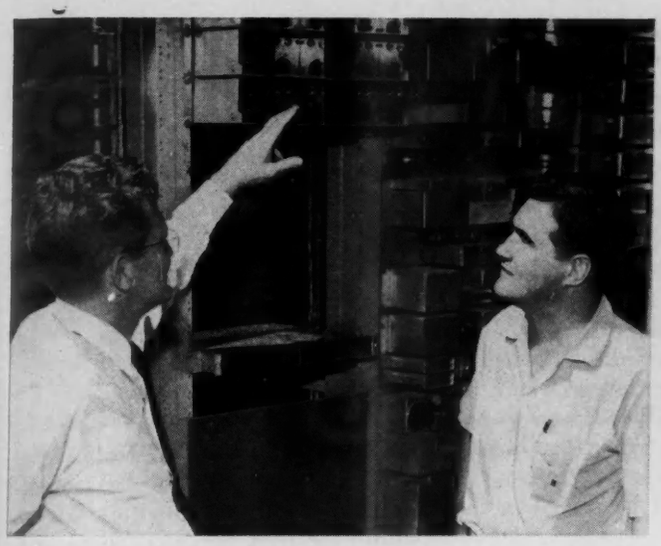
Concerning Graybar — Max E. Wettstein, President and General Manager of the Florida Telephone Corporation, says:

"Graybar has furnished us with line supplies, telephone instruments, cable and all of the various and sundry items comprising basic telephone plant for a long period of years.

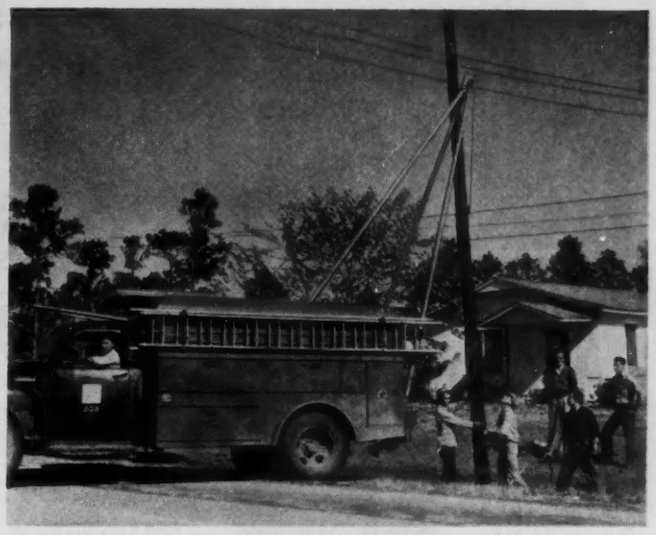
"Throughout these years, we have experienced excellent Graybar service and have enjoyed the use of their quality products. Graybar has given us a specialized service through their experienced local representatives and nearby warehouse facilities which we feel is unsurpassed. In normal operations and in the many instances involving special treatment of urgent orders, Graybar has always come through to our complete satisfaction.

"We have always valued highly the fine relationship which Graybar and Florida Telephone have had with each other".

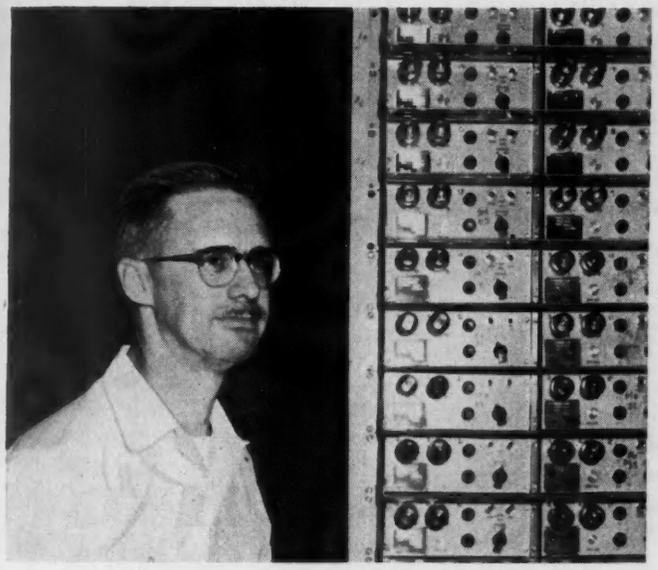
Thanks, Mr. Wettstein—we feel the same. And that's the way we operate throughout the United States, too. Many independent telephone companies rely on Graybar's warehouse system to carry their inventory. Pole line supplies for maintenance and new construction . . . central office equipment . . . subscriber carrier and toll circuit carrier . . . linemen's tools and safety equipment — all are conveniently available from Graybar located nearby. You too can benefit from Graybar's services. Call us for any telephone need. Like you, we are proud of our independent status. Graybar is owned solely by its operating and retired employees.



New Lynch B112 repeater installation is inspected by R. D. Eshbaugh, Chief Equipment and Building Engineer, and W. C. "Spec" Winfree, Graybar Manager of Communication Sales (pointing). The Florida Telephone Company now operates 18 exchanges and 5 subexchanges in eight counties in Central Florida. An accelerated expansion and improvement program will soon see its five remaining manual exchanges converted to dial operation.



Progress of a construction crew building additional rural lines is checked by Ralph Oswald, Plant Engineer, and Charles Whitaker, Line Foreman (left and right background). For both new construction and everyday maintenance, Florida Telephone management recognizes the importance of quality tools and supplies that their line crews know and respect and which are quickly available from Graybar.



H. G. Williams, Equipment Maintenance man, stands before the Lynch B112 repeater bay in the Winter Garden Toll Center and Exchange Building which was constructed in 1954. These repeaters are used with a new cable recently installed between Apopka and Winter Garden to expand facilities to the Winter Garden Toll Center.

Here Graybar Salesman John Coleman and General Plant Supervisor and Purchasing Agent John Riggs, at right, interrupt their discussion of a list of telephone supplies ordered from Graybar to smile for the camera. Graybar's specialized services and experienced personnel have done much to cement the healthy relationship between it and the Florida Telephone Corporation.

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Call Graybar first for...

GRAYBAR ELECTRIC CO., INC.
420 Lexington Avenue
New York 17, N. Y.

Graybar QUALITY *Everything Electrical*

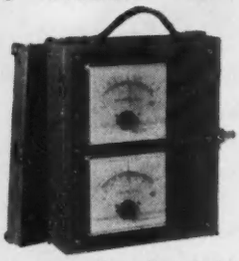
IN OVER 130 PRINCIPAL CITIES

Stewart

TEST EQUIPMENT

Locates Line Trouble FAST

DUAL ELECTOLYSIS VOLTMETER Model G



Double Meter for simultaneous readings. Zero Center . . no lead changing for fluctuating polarity.

VOLTMETER, 50,000 ohms per volt, .3 to 300 volts in seven ranges.

MILLIVOLTMETER, a low 2.5 Millivolt range . . . 2.5 to 500mv in 6 ranges.
Oak Case, 9"x10"x4½" — Wt. 6 pounds.

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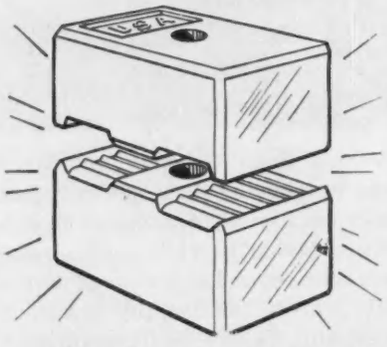
KEEP CUSTOMERS HAPPY

PROVIDE CONTINUOUS SERVICE WITH PORCELAIN PRODUCTS TELEPHONE INSULATORS



Made of highest quality dry-process electrical porcelain . . . Porcelain Products telephone insulators assure long, continuous service . . . customer satisfaction. Porcelain Products, Inc. has served the telephone industry for 62 years, offering a complete line of insulators that meet AT & T and REA specifications . . . simplifying installation . . . reducing maintenance. Write for complete information, today!

PORCELAIN PRODUCTS, INC.
Findlay, Ohio

Ralph Van Trine Dies

RALPH VAN TRINE, 62, Durham, (N. C.) Telephone Co. executive vice pres., died unexpectedly August 18, after suffering a heart attack.

The son of David A. Van Trine and Ina S. Thwing Van Trine, he was a native of Salina, Kan. He spent the early part of his life there and attended the Salina primary schools. In 1919 he received the B.S. degree from Kansas State College where he was a member of Beta Theta Pi social fraternity and Sigma Tau honorary engineering fraternity.

In World War I he served in the navy.

He was nationally know in the telephone industry. He first was associated with the United Telephone Co. of Kansas and he served as its vice president and traffic superintendent from 1920 to 1936. From 1936 to 1940 he was associated with Telephone Services, Inc. and served as vice president. In 1940 he became affiliated with the Durham Telephone Co. and had served as its executive vice president since that time.

He held membership in the United States Independent Telephone Association and the Independent Telephone Pioneer Association, the American Legion, the Armed Forces Communication Association, the Durham Rotary Club, the Hope Valley Country Club, and the Durham Engineers Club.

His wife, the former Miss Leona Teichgraeber, died April 15, 1954.

Surviving are one daughter, Mrs. Marian Van Trine Davis of Tallahassee, Fla.; one grandson, Bruce Davis Jr. and one granddaughter, Miss Carol Davis, both of Tallahassee, Fla.; and a sister, Mrs. Vernon Brodine of Salina, Kan.

Illinois Consolidated Names A. A. Wilson, Chief Engineer

ILLINOIS CONSOLIDATED TELEPHONE CO., Mattoon, Ill., has named A. A. Wilson, chief engineer, heading a new department established to meet demands of a huge expansion and improvement program contemplated by the company.

Wilson left the Illinois Bell Telephone Co. in 1930 to accept a position with Illinois Consolidated. He assumes his new responsibilities following a succession of positions with the company. Most recently he has headed the plant department as general plant manager.

O. R. Roach, has moved to Mattoon from Fort Smith, Ark., to succeed Wilson as general plant manager. Roach began his telephone career with the Bell Company at Oklahoma City. For the past several years he has served the Gary Group of Independent telephone companies on special assignments.

General of Indiana To Headquarter at Fort Wayne

GENERAL TELEPHONE CO. of Ind., Inc., will move its general offices from Lafayette to Fort Wayne within the next few months, according to an announcement by President L. H. Meyer.

Principal reason for the move, according to Meyer, is the need for more office space in a building more suitable for future expansion. Approximately 100 employes will be transferred to Fort Wayne while the revenue accounting department of approximately 80 employes will remain in Lafayette.

The company employs 1,500 persons, excluding the personnel at Fort Wayne and Terre Haute. When complete integration with these other companies is effected, General of Indiana will serve more than 275,000 telephones within the state.

Sequoia Process Elects W. W. Valentine President

THE BOARD of directors of Sequoia Process Corp., Redwood City, Calif., have announced the election of W. W. Valentine as president of the electronic wire and telephone cable manufacturing concern. Mr. Valentine fills a vacancy left by former president Paul M. Cook who recently took a leave of absence from the company because of ill health.

Mr. Valentine has long been associated with Sequoia Process Corp. and on its board of directors since 1955. In addition to his present duties, Mr. Valentine is on the board of directors of Stanford Research Institute of Menlo Park, Calif.

Also elected to the board was Beardsley Graham, executive vice president of Sequoia. Mr. Graham, formerly an assistant director of Stanford Research Institute, joined Sequoia as assistant to the president in February, 1956 and was recently appointed to his present position.

Yours For the Asking—

FREE LITERATURE

To obtain copies of literature reviewed by this department, write Readers' Service, 7720 N. Sheridan Road, Chicago 26, Ill.

New Listing of American Standards

SIXTEEN HUNDRED American Standards are indexed in the new "List of American Standards" just published.

There are 400 American Standards in the electrical field. These cover various aspects of wiring, power switchgear, radio, electrical measuring instruments, rotating machinery, transformers, regulators and reactors, insulating materials, electron tubes, lightning arresters, household appliances, lamps, conduit components for electronic equipment and preferred voltage ratings.

The 56-page booklet also describes the work of the American Standards Association, and gives information on how to purchase both American Standards (with quantity discounts) and those from other countries.

Organizations which sell American Standards in 43 other countries are also listed. Special publications of the ASA, many of them free, are described in the booklet.

Bending Conduit Easily and Accurately

"HOW to Bend Rigid or Thin-wall Conduit Easily and Accurately" is the title of folder published by Gustave Lidseen, Inc. The folder illustrates the complete line of Lidseen "Chicago" pipe benders featuring the exclusive calibrated degree scale vital for making accurate repeat bends with ease.

Each model is fully described showing capacities, performance data and bending circles for rigid or thinwall conduit.

The folder includes prices of units and parts and features, exploded views with parts numbered for identification purpose.

Electrical Standards

FOUR HUNDRED cost cutting tools for the electrical industry are described and indexed in the newly-revised edition of "The 400 American Standards in the Electrical Field."

The 67-page publication is designed to help the user and prospective purchaser of standards in the electrical engineering area find the applicable American Standard for the product in which he is interested.

The booklet also gives briefs on each of the current International Electrotechnical Commission recommendations: a listing of all projects under the jurisdiction of the Electrical Standards Board of ASA — including officers, sponsors, and scopes of these projects. It contains general information on the work of the American Standards Association, the Electrical Standards Board and the International Electrotechnical Commission. It explains how and why American Standards are developed and describes the benefits to manufacturers, users and the general public.

Truck Catalog

INTERNATIONAL HARVESTER CO. offers new 20-page catalog which contains complete information on International four-wheel conventional and cab-over-engine heavy-duty trucks with 6-cylinder engines. Gasoline, liquefied petroleum gas, and diesel-powered models are covered.

Full-color and two-color illustrative treatment is employed throughout the book. It presents design and operating features of the four-wheel R-line and CO models, manufactured

Electricians love it...

It's brand NEW

Pastushin *Clip-It saves time and effort

Ever try to hold a bunch of wires and clamp them securely at the same time? Let Clip-It do the work – This punched spring steel clip holds securely to the bolt on the electric wiring clamp while you tighten. Available in all sizes to fit clamp attachment bolts. Write for samples and quantity prices.

NEW–EXCLUSIVE

*Patent Pending

PASTUSHIN INDUSTRIES INC.

5651 WEST CENTURY BLVD., LOS ANGELES, CALIFORNIA

Developers and Manufacturers of Aircraft Fasteners

Scru- Tite anchors

are not affected by atmospheric conditions. No corrosion or deterioration. Cold flows. A fraction of the weight of metal anchors. Drill hole, then hammer it home. A new line of expansion anchors available soon. Write for information.

Available in 10 sizes, and in several assorted lengths. Millions in use.

Immediate delivery on all standard screw size anchors.

Underwriter's Laboratory Approved

MASTERCRAFT PLASTICS CO. Inc.

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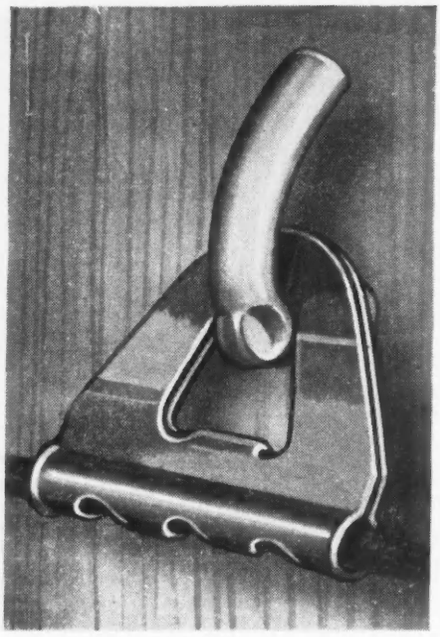

Speed the job . . .

Secure long line drops with

KEARNEY
DROP WIRE CLIPS

Wherever intermediate fastenings are needed on straight line drops, these convenient clips can be installed in a matter of minutes. No special tools are necessary. Simply slip the clip onto the wire and crimp it tight with pliers. It will hold firm permanently . . . without damage to the wire or insulation. KEARNEY Drop Wire Clips can be used with either parallel or twisted pair drop wire.

For Better Construction . . . Safer Maintenance

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Canadian Plant: Guelph, Ontario

at the company's Fort Wayne, Ind., works, as straight trucks and truck tractors including the R-185, R-190, R-200, R-210, R-220, CO-180, CO-190, CO-200, and CO-220 series.

Splicing Kits

A NEW 12-page booklet containing instructions and application information for the entire line of "Scotchcast" brand splicing kits has been announced by Minnesota Mining & Manufacturing Co.

The illustrated four-color booklet describes in detail the "Unipak" container of "Scotchcast" electrical insulating resin No. 4 for pouring field-encapsulated splices and the three types of splicing kits with which it is used.

The 82-A series — split mold splicing kits for making in-line splices for weather exposed or direct burial locations — —is described, showing the relative size of the three available kits, what they include, and how they are used.

The 90-B1 kit for making wye or tap splices with a split-mold is pictured and step-by-step instructions are given. This kit is for use in cathodic protection ground bed splicing, street lighting systems and traffic signal systems.

Also described is the 89 series of kits for communication splices of either the wye or in-line variety.

The last section of the book pictures eight of the many applications in which "Scotchcast" electrical insulating resin No. 4 can be used for making poured splices without a splicing kit.

Plastic Couplings

"NEW Johns-Manville Plastic Couplings," is the title of an illustrated, 4-page folder which presents the time saving and money saving advantages of the couplings for Transite Ducts used in telephone conduit lines. The on-the-job photographs show installations in various sections of the country. Also shown are some of the various methods of installing and positioning Transite Conduit.

Thermistors

A REVISED 53-page manual on Thermistors, thermally sensitive resistors for automatic detection, measurement and control of physical energy, has been released by General Electric's Mettalurgical Products Department, Detroit.

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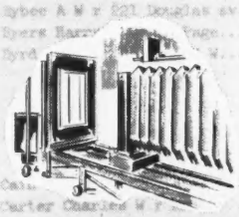

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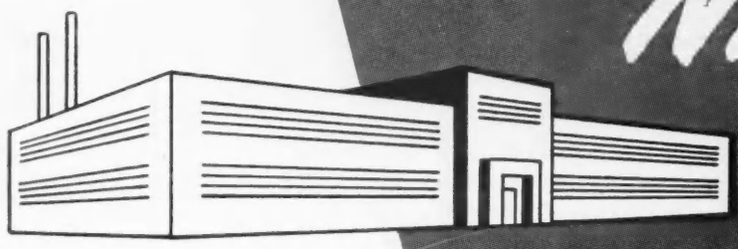
SUPPLIERS' NEWS BRIEFS



IBM Names Lee Jones Dallas, Texas, Representative

INTERNATIONAL Business Machines Corp. has announced the appointment of Lee R. Jones as special representative in the public utilities department, with headquarters at Dallas, Texas. In his new post Mr. Jones will coordinate sales activities and planning of applications of IBM equipment to meet the needs of companies in the public utilities field. He will also conduct classes for customer personnel and seminars for IBM sales representatives, to keep them abreast of machine accounting and data processing developments.

Mr. Jones became a member of the IBM company in 1950 in Dallas. He was named branch manager in the Waco sales office of the company in 1955, his most recent post. He is a graduate of Texas State College.

Stromberg-Carlson Names Three To Technical Writing Post

APPOINTMENT of three Section Heads in the technical writing staff of Stromberg-Carlson's Telephone Division has been announced by Frederic W. Haupt, advertising manager of the division.

The three men, all of whom will report to Jacques S. Herman, chief of sales and technical publications, are: Morris Herman, who will head the miscellaneous equipment group: Milton D. Wood, who will supervise the group working on systems, and John S. Orlowski, who will direct the group concerned with electronics.

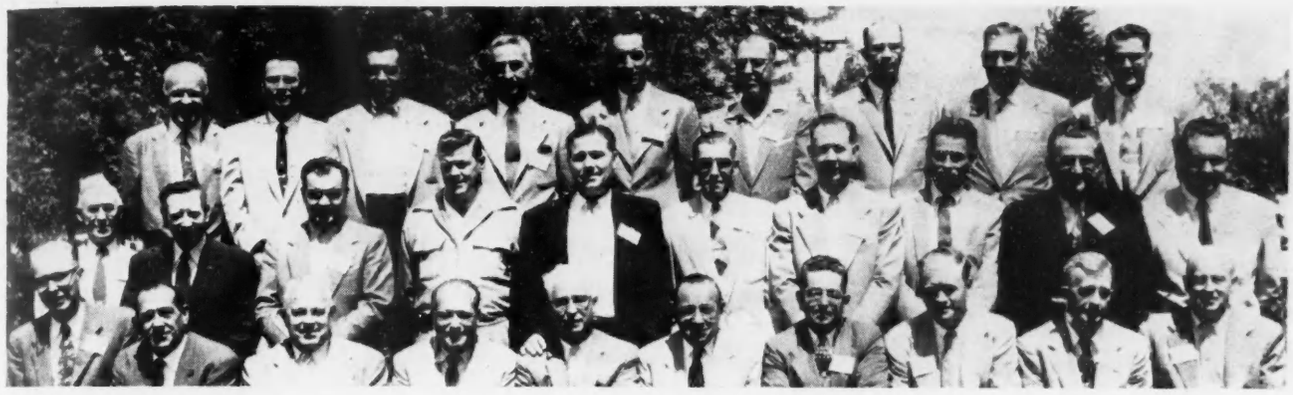
Morris Herman joined the Stromberg-Carlson technical writing staff in 1955, after more than 13 years of experience as an electronics instructor at the Signal School of the U. S. Signal Corps at Fort Monmouth, N. J. His last position there was as Chief of the VT Fuse Countermeasures Course.

Prior to joining Stromberg-Carlson earlier this year, Mr. Wood was an instructor in wire communications for the Department of the Army at Fort

SEVERAL distributors and major users of power and communication equipment attended a 2-day seminar conducted by Lorain Products Corp., at its Lorain, Ohio factory. The first session was attended by: *FRONT ROW* (L to R) —G. H. POHM and H. M. HUGE of Lorain; P. EVERITT, Ohio Bell Tel. Co., Columbus, O.; C. P. DEVAL, Kellogg Swbd. & Supply Co., Chicago; W. P. JACKMAN, New York Tel. Co., New York; E. STOY, American District Telegraph Co., New York City; C. D. SUHR and LLOYD ROSS, Ohio Bell Tel. Co., Columbus, O.; J. A. HAEFNER, Automatic Electric Co., Chicago.

SECOND ROW **(L to R) — R. H. McMILLAN, and C. P. STOCKER, Lorain Products Corp.; R. HETRICK, Ohio Bell Tel. Co., Columbus, O.; W. D. WATSON, Kellogg Swbd. & Supply Co., Chicago; I. C. BOETTGER, Wisconsin Tel. Co., Madison; G. C. PLASMIER, S. S. MacANDREW, and R. H. STOLL, Automatic Electric Co., Chicago; J. E. YARMACK, Lorain Products Corp.**

THIRD ROW **(L to R): — R. K. VANDEUSEN, Lorain Products Corp.; D. W. CHAPPELL, General Tel. Co. of Wisconsin, Madison; E. ALEXANDER, Stromberg-Carlson Co.; Rochester, N. Y.; L. K. LEHNER and W. C. LORE, Ohio Bell Tel. Co., Columbus; R. S. PARKER, American District Telegraph Co., New York City; C. A. MUTCHLER, General Tel. Co. of Wisconsin, Madison; E. C. LANDRY, Stromberg-Carlson Co., Rochester; H. T. McCAIG, Lorain.**



GUESTS at second session of seminar conducted by Lorain Products Corp. Bottom Row (l. to r.): H. M. HUGE, Lorain Products Corp.; PAUL GREEN, Ohio Bell Tel. Co.; H. W. SELLE, Stromberg-Carlson Co.; C. R. BITSON, L. D. MOORE, L. M. PATTERSON, W. E. SCOTT, JOHN G. WHITE, F. SHARKEY, Ohio Bell Tel. Co.; R. K. VAN DEUSEN, Lorain Products Corp.

Middle Row (l to r): H. T. McCAIG, C. P. STOCKER, Lorain Products Corp.; M. SMITH, Leich Electric Co.; G. B. RANDALL, General Tel. of Wis.; W. R. VIA, C. R. HENDRICKSON, J. A. HINKLE, Ohio Bell Tel. Co.; E. J. SULLIVAN, Stromberg-Carlson Co.; R. H. LISTMAN, Automatic Electric Co.; N. M. WERNER, Lorain Products.

Top Row (l to r): J. E. YARMACK, Lorain Products Corp.; W. E. DOBBECK, Leich Electric Co.; H. J. DONALDSON, General Tel. of Wis.; W. J. HODRUS, Ohio Bell Tel. Co.; R. M. CLEMENTS, HAROLD M. HOWE, Kellogg Switchboard & Supply Co.; W. F. SINTZ, Ohio Bell Tel. Co.; A. H. KROON, Automatic Electric Co.; R. H. McMILLAN, Lorain Products Corp.

Monmouth, N. J. In that capacity he was sent to Stromberg-Carlson's XY Training School for specialized instruction in XY Dial equipment, and on his return to Fort Monmouth set up a training course for U. S. Army personnel assigned to work with this type of equipment. Previously he had been a switchman in the Watson Laboratories.

Mr. Orlowski came to Stromberg-Carlson from The Signal Corps Publications Agency, at Fort Monmouth, N. J., where he was a technical writer, while also serving as a teacher of evening courses in radio, television, communications and commercial electronics at Trenton Technical Institute. He holds an Electrical Engineering degree from Penn State College. After graduation he was an assistant engineer for Henry Clay Bock & Co., Ltd., in Trenton, until the Navy took up the option of his Naval Reserve commission. After assignment to various training schools and combat zones, he became Aviation Chief Radioman.

Lenkurt Names Three To New Positions

THE INTEGRATION of all sales activities into a General Commercial Relations Division at Lenkurt Electric Co., San Carlos, Calif., has resulted in the promotion of three engineers to department managers.

B. L. Arnold will be responsible for sales to Independent companies through Lenkurt's distributor, Automatic Electric Sales Corp.; Alden P. Bowser will be in charge of sales to government and industry; and Herbert K. Krengel will handle sales relations with the Bell System.

Arnold formerly was a sales engineer for Lenkurt's "Engineer, Furnish and Install" service. He has been associated with the Independent telephone industry since 1938, including four years with General Telephone Co of California at Santa Monica and eight years with Inter-State Telegraph Co. at Bishop, Calif. He is a member of AIEE and the Independent Telephone Pioneers.

Bowser, who joined the company in 1954, has been engineering representative, sales engineer, manager of carrier and radio sales, and sales manager of the Lenkurt Sales Corp. His communications experience also includes 12 years with the Civil Aeronautics Administration, with four years as deputy chief of the Electronics Branch. He holds the BSEE and MSEE from Massachusetts Institute of Technology.

Krengel, with Lenkurt since 1950, has 15 years of experience in communications. His positions with the company have included applications engineer, manager of systems development, and Bell Systems commercial representative. He was associated with the installation division of Western Electric Co. until joining Lenkurt.

JAMES B. BEHLING has been assigned to the Chicago headquarters of International Automatic Electric Corp. and appointed export district manager of the Caribbean area and Central America. He joined the Automatic Electric group in 1950 as assistant to the export manager. In 1952 he was promoted to division manager for Latin American exports, and in 1954 was named staff engineer at the International offices in New York city, a position he held prior to his present position.

IBM Names Tarbutton to Advertising Post

JOHN R. TARBUTTON has been named advertising manager for International Business Machines Corporation's accounting machine division In his new post he will direct advertising activities for IBM's entire line of accounting machines and electronic data processing equipment. Mr. Tarbutton will make headquarters at New York. He has been serving as

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and Years-
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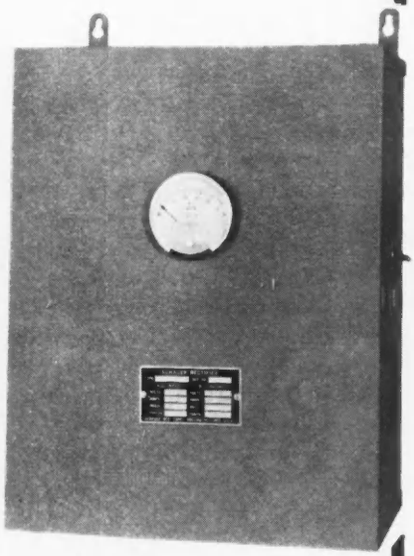

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branch manager of the IBM sales office in Dayton.

Mr. Tarbutton joined IBM in 1939 as a sales representative in Cincinnati. He subsequently served in various sales posts before going to Dayton in 1942. He became branch manager in Mansfield in 1948 and in 1953 returned to Dayton.

Exide Names Faust Manager, Public Relations

WILLIAM C. FAUST has been appointed manager of public relations for The Electric Storage Battery Co., R. E. Wright, director of industrial and public relations, has announced.

He formerly was public relations director for Geare-Marston, Inc., Philadelphia and New York advertising and public relations agency.

WILLIAM C. FAUST

In his new post Faust will handle employe publications as well as institutional and financial public relations for the manufacturer of Exide, Willard and Grant storage batteries.

A former newspaper man, Faust held editorial positions on the old *Philadelphia North American*, the *Public* and *Evening Ledgers* and the *Evening Bulletin* prior to entering the field of public relations. He also founded and edited the *Glenside (Pa.) News*, now published by *Times-Chronicle Newspapers*, Jenkintown, Pa.

Harry G. Burd Joins Sequoia Process Corp.

HARRY G. BURD, former president of Superior Wire & Cable Co., Hickory, N. C., has been appointed

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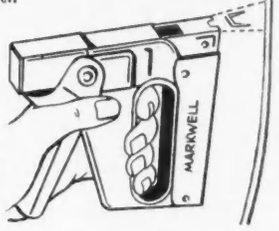

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L3M 7/16" Leg	3.05	2.85	2.60
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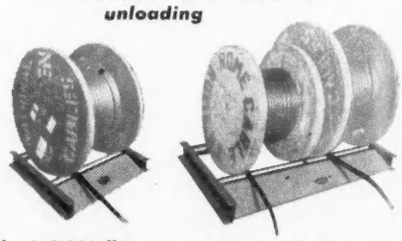

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HARRY G. BURD

special consultant to the Sequoia Process Corp., Redwood City, Calif., for its telephone cable manufacturing, the company announced last month.

Mr. Burd, whose experience in cable manufacturing dates back to 1910, will assist the company in all phases of its new telephone cable operations, including production, sales, and engineering. Sequoia Process Corp., whose primary product until this time has been electronic wire and cable, recently began telephone cable manufacturing at its Redwood City plant.

A graduate of Cornell University, Mr. Burd began his career in 1910 with the Standard Underground Co., Pittsburgh, Pa., working on the design, engineering, and field installation of both paper lead telephone cables and power cables.

In 1920 he became assistant to the president of the National Conduit & Cable Co., Hastings-on-Hudson, N. Y. The company later became one of the major divisions of Anaconda Wire & Cable Co. as a result of a merger, and Mr. Burd continued with the new organization as manager of power cable sales. While with Anaconda, he was also active in the engineering of new methods for splicing and terminating cable.

In 1949, Mr. Burd entered the relatively new field of plastic insulated cable when he left Anaconda to join the Ansonia Electrical Co., Ansonia, Conn. From 1949 to 1953, Mr. Burd served as vice president of sales, and he also helped to expand the company's newly-formed telephone cable division.

In 1953, after originally planning to retire, Mr. Burd at the invitation of a group of industrial leaders in the southeast, organized a new company at Hickory, N. C., specializing in plastic-insulated telephone cables. The company, Superior Wire & Cable, enjoyed unusually rapid growth.

Mr. Burd, who resigned from Superior last year, participated in the initial studies that led to Sequoia Process's decision to expand into the telephone cable market, and he also assisted the company on an advisory basis during the initial phases of its manufacturing this year. Sequoia's plant is the first on the west coast specializing in the manufacture of plastic-insulated telephone cable.

Kellogg Swbd. Announces Three Executive Changes

GEO. T. SCHARFFENBERGER, vice president and general manager, Kellogg Switchboard & Supply Co., Chicago, a Division of International Telephone & Telegraph Corp., has announced the following executive changes: Thomas P. Leddy, formerly an assistant vice president, has been elected vice president in charge of

THOMAS P. LEDDY

government relations; William P. Hollis, former sales manager, has been elected vice president and director of marketing, and O. C. Bailey, has been named sales manager.

Mr. Leddy has been associated with IT&T companies since 1943 when he joined the Federal Telephone & Radio Co., Clifton, N. J. Before coming to Kellogg, he was vice president, general manager and a director of Federal Electric Manufacturing Co., Montreal, Canada.

In his new capacity at Kellogg, he

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NEW PRODUCTS' SHOWCASE

Ventilator & Heater

THE MOPECO Ventilator & Heater, manufactured by Morrison-Pelsue Co., was designed for year around underground operations. A constant supply of forced fresh air ventilating the manhole prevents accidents caused by explosions or oxygen deficiencies. It also provides the cable splicer with a safer and better place to work.

For summer time operation, the MoPeCo is a ventilator, blowing 300 to 600 cfm of fresh air into the manhole. When winter comes, the MoPeCo becomes a ventilating heater. In a matter of a few seconds, a spark ignites the burner and warm fresh air is being blown into the manhole.

In the MoPeCo Model "PE," the small engine (Briggs & Stratton) has been converted to L. P. Gas (Propane) carburetion. Only one type of fuel, Propane, is used. A spark, from the engine magneto, lights the burner whenever the splicer desires heated air in the manhole.

New ventilator-heater for underground operations.

The Model "DCM" is equipped with a direct current electric motor and the Model "ACM" is equipped with an alternating current motor. These models use electric motors to turn the blower. The source of electric power to operate the motor, usually comes from portable generators or from a 110-volt drop supplied by the local electric utility.

The burner of the MoPeCo Model DCM or ACM Ventilator and Heater uses Propane and may be ignited either manually or by spark ignition when heated air is desired. The spark ignition of the burner in the MoPeCo Model DCM or ACM is an optional item and it is available at extra cost. For complete data, *Check New Product* 978.

Terminal Fitting

COMMUNICATION Equipment & Engineering Co., 5646 W. Race Ave., Chicago 44, Ill., has announced plans for marketing the Ceeco Floorduct Terminal Fitting.

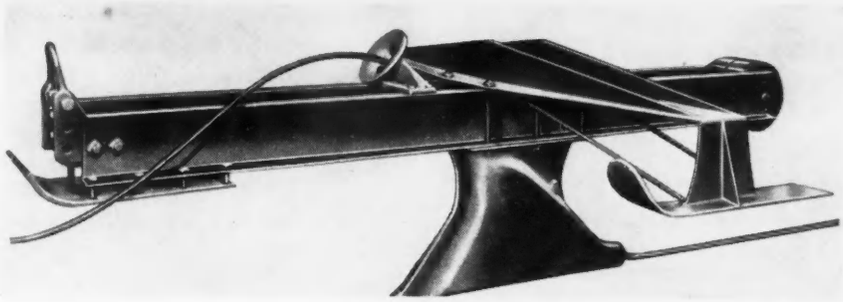
The fitting is designed for use with the WE-12A connecting block or other connecting blocks of similar type. Base fitting is provided with knockouts for attachment to National Florduct.

When installed, the connecting block is raised 3" from floor to prevent moisture from entering when floor is mopped.—For complete data. *Check New Product* 979.

Cable Laying Plow

STABILIZING skids that resemble the wings on an aircraft have been added in the new model cable layer made by (Pemco) Philadelphia Electrical & Mfg. Co.

According to the manufacturer the skids prevent the plow from rocking



Cable-laying plow.

side to side, keep it from digging in, and make it easier to handle.

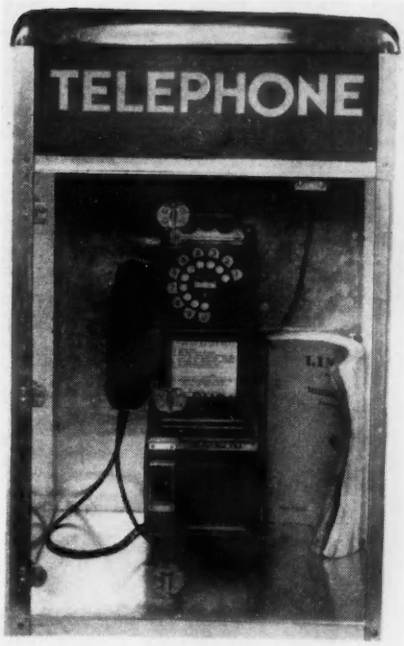
Further particulars may be obtained by *Checking New Product* 980.

Outdoor Booth

A LOW COST outdoor telephone booth for use in many new locations has been developed by the Prairie Implement Co., Lincoln, Nebr. The Prairie Model "C" Outdoor Booth is 13"x18"x31". It is well illuminated, attractive and ruggedly built. The booth is easily installed at a low cost.

At present Model "C" booths are being used in small towns, new real estate developments, filling stations, parking lots, and for curb side drive in use with the party making his call from the car seat. They are adaptable to any installation that calls for an attractive, low cost unit.

The sides and self closing doors are made of clear plexiglas. The roof and signs are of red plexiglas. The back and frame are of aluminum. Night illumination is brilliant with a strong glow from the red roof and signs. All service is through a concealed tube at the rear of the booth.



For complete data *Check New Product* 981.

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THE BUYERS' GUIDE

ADVERTISING. Directories — *General Telephone Directory Co., 1800 Busse Highway, Des Plaines, Ill.*—[ADV. 1]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, *W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.*—[ADV. 2]

BOOTHS—Acoustic Telephone — *Sherron Metallic Corp., 1202 Flushing Ave., Brooklyn 6, N. Y.*—[ADV. 3]

CORDS, Switchboard (with or without plugs), Instrument (retractable and regular) and Operators — *Commercial Cord & Supply Co., Inc., 26 Main St., Clifton Springs, N. Y.*—[ADV. 4]

INSULATORS, Porcelain — *Porcelain Products Inc., Box 300, Findlay, Ohio.*—[ADV. 5]

PIPE PUSHERS — *Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa.*—[ADV. 6]

POLE HOLE DIGGERS — *For derrick mounted trucks. Tele-E-Lect Products, Inc., 9613 Minnetonka Blvd., Minneapolis 26, Minn.* —[ADV. 7]

POLES, Southern Yellow Pine — *Taylor Colquitt Company. 217 E. Main St., Spartanburgh, S. C.*—[ADV. 8]

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*—[ADV. 9]

PROTECTIVE EQUIPMENT — *Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.*—[ADV. 10]

REBUILT TELEPHONES & SWITCHBOARDS — *Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 26, Ill.*—[ADV. 11]

TRUCK BODIES — *Highway Trailer Co., Edgerton, Wisc.*—[ADV. 12]

WIRE, Insulated — DATED DROP WIRE — Neoprene or Weatherproof — *Alphaduct Wire & Cable Co., New Brunswick, N. J.*—[ADV. 13]

WIRE, Insulated Drop and Bronze or Copperweld — *Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket. R. I.*—[ADV. 14]

WIRE, Telephone, for all inside and outside uses — *Whitney Blake Co., New Haven, Conn.*—[ADV. 15]

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Photograph courtesy Lincoln (Neb.) Telephone and Telegraph Co. and Automatic Electric Sales Corp.

CALCULAGRAPH *Company*

HARRISON, N.J.

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will be responsible for sales involving government requirements, administration of government contracts and related activities. He is a member of the National Industrial Security Administration, Armed Forces Communications and Electronics Association and the National Association of Cost Accountants.

Mr. Hollis has been associated with various IT&T companies since 1944. During World War II, he spent two

WILLIAM P. HOLLIS

years in the Washington, D. C. and New York City offices of the Chief Signal Officer, U. S. Army, where he had charge of the commercial aspects of the teletypewriter networks.

Well-known throughout the telephone industry, Mr. Hollis began his career in the telephone industry with Northwestern Bell Telephone Co., Omaha, Neb. He subsequently became commercial manager of the telephone properties for Central Electric & Gas Co., at Sioux City, Ia. and Sioux Falls, S. D. In this latter capacity, he was instrumental in converting many telephone exchanges in the midwestern states from manual to dial equipment.

Mr. Bailey, who is also well known throughout the telephone industry, began his career with Southwestern Bell Telephone Co., Fort Worth, Texas. He served three years as a flying officer with the Air Force during World War II in the Middle East and China-Burma-India Theaters of Action. After the war, he joined Kellogg as a field representative and has since served as district manager for the states of Texas, Louisiana, Oklahoma and Arkansas; assistant manager of the Western Division, Kansas City,

O. C. BAILEY

Missouri; and manager of the Southwestern Division, which he organized, in Dallas, Texas. He was assistant sales manager in charge of field sales activities at the time of his recent promotion.

Drop-Wire Dead-Ends

PREFORMED LINE PRODUCTS CO., has a new drop-wire dead-end made of stainless steel for corrosion resistance and neoprene coated to cushion the grip, eliminate abrading or cutting through insulation and assure low radial pressure over the entire holding area.

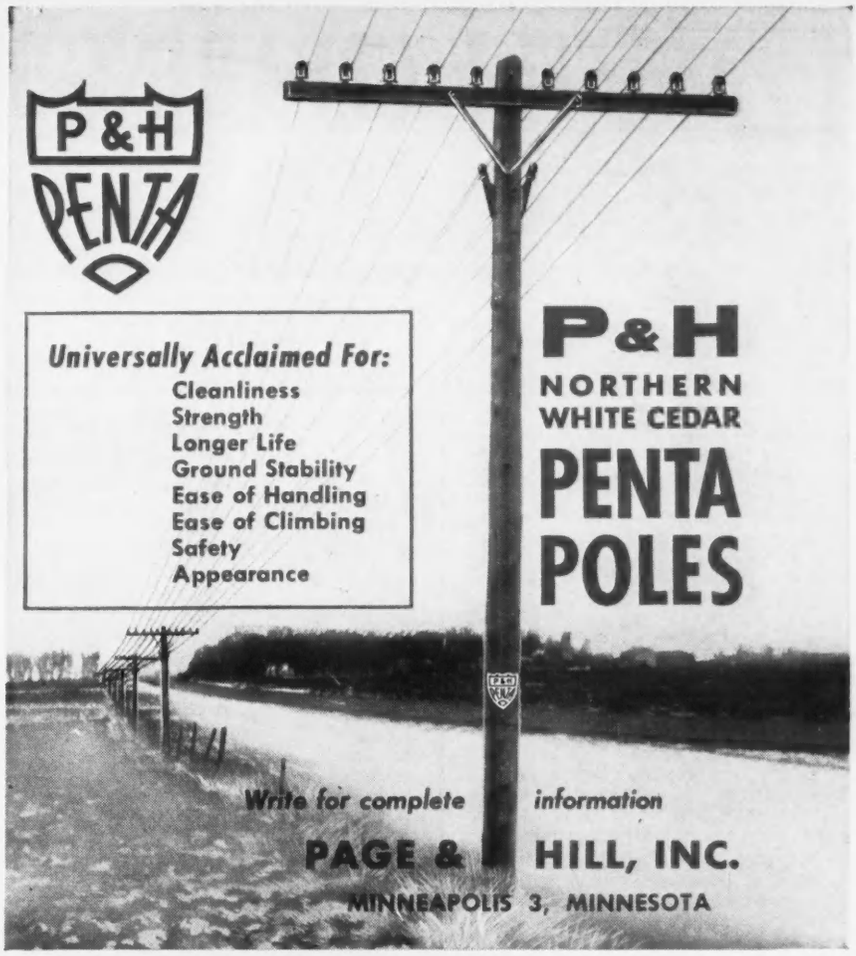
The new Drop-Wire Dead-End design prevents damaging concentrated pressures, eliminates slippage and cold flow. Multiple-wire bails prevent fatigue failure.

For further information and complete details, write Preformed Line Products Company, 5349 St. Clair Avenue, Dept. TE&M Cleveland 3, Ohio.

Cable Reel Jack

T. J. COPE, INC., has announced that its cable reel jack has been redesigned for greater efficiency. Constructed of welded steel sections, the Reel Jack is ratchet-operated and designed expressly for cable reels.

Base sections are of 4°, 5.4 lb. channel with side and back legs of $\frac{3}{8}$ x 1-$\frac{3}{4}$° steel. The base measures 24″ across and 14″ in width to give maximum support in both directions. The swivel yoke ranges in height from 27-$\frac{3}{4}$″ to 45$\frac{1}{2}$″. The wrought steel square thread has a diameter of 2″ and is 21″ long.



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Assistant District Manager in county seat town with 4 tributary dial exchanges and a district total of 9200 dial telephones. Opportunity to learn commercial and plant management in an operating company with 66 exchanges and over 96,000 telephones. Address Col. Wm. C. Henry, President Northern Ohio Telephone Company, Bellevue, Ohio

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Class A Telephone Company in Northern California. Excellent opportunity for young man not using all of his abilities in his present position. Requires ability to plan and supervise engineering of outside plant facilities and central office and carrier additions. All replies will be held confidential. Send complete resume first letter to Box 9029 Telephone Engineer Publ. Corp. 7720 N. Sheridan Road, Chicago 26, Illinois.

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Step by Step Switchman
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HELP WANTED

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We try to make Alphaduct the finest, longest lasting drop wire money can buy. Quality materials are used throughout, step-testing during every phase of manufacture assures uniform high standards. Alphaduct drop wire is dated with a color coded thread so you can tell for sure how long it lasts.

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GENERAL SYSTEM

Kellogg Names Stoll Western District Mgr.

ROBERT A. STOLL has been appointed district manager for the Western Sales Division of Kellogg Switchboard & Supply Co.

Mr. Stoll will supervise Kellogg's sales activities in Missouri, Kansas and Colorado and will report to the Western division manager, Kansas City, Mo.

He joined the Kellogg Company in 1951 as a field representative in Colorado and Kansas.

New Revenue Booster Offered by Auto. Elec.

A NEW envelope stuffer, titled "Day Brighteners," designed to help telephone companies go after new sources of revenue is now available free from Automatic Electric.

In two colors, the new stuffer describes the "extra" services that subscribers often do not know about, such as a telephone outlet in the patio, a buzzer in adjoining room or office, a keyswitch so you can answer several telephones from one desk, an outdoor telephone, noise killers, telephone answerers, telephones that talk louder, and other services.

The stuffers may be obtained free in any quantity from Automatic Electric Sales Corp., 1033 West Van Buren St., Dept. TE&M, Chicago 7, Ill.

Allegheny Ludlum Buys Paul R. Repath, Inc.

ALLEGHENY LUDLUM STEEL CORP. has purchased Paul R. Repath, Inc., of 641 East 61st St., Los Angeles, Calif., a leading West Coast producer of electrical steel laminations, metal stampings, and deep drawn transformer cans.

Allegheny Ludlum's wholly owned subsidiary, The Arnold Engineering Co., specializing in magnetic materials, will operate this plant as Repath Pacific Division of The Arnold Engineering Co.

Paul R. Repath, who founded the West Coast company in 1930, will continue to direct the activities of the Los Angeles facility. No changes in Repath personnel are anticipated.

Robert M. Arnold, president of The Arnold Engineering Co., stated that the new arrangement will offer Repath's customers the added dependability of a mill supply of steel backing up the Los Angeles plant.

STROMBERG-CARLSON

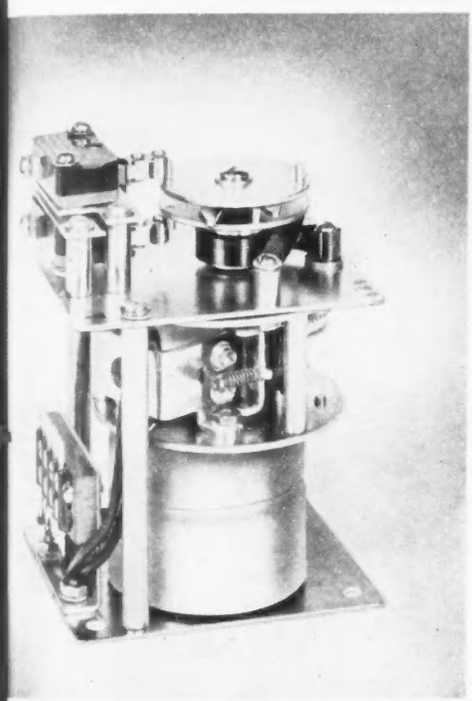
Transmitter

A DIVISION OF GENERAL DYNAMICS CORPORATION

VOLUME 5, NUMBER 6 • SEPTEMBER 1956

The Toll Ticketing Call Timer

By E. L. Bleier, Electro-Mechanical Engineering



Call Timing Mechanism used in XY Toll Ticketing Systems is compact and accurate.

As the development work progressed on Stromberg-Carlson's Toll Ticketing equipment, a need appeared for a compact and accurate timing unit, to be used to time the toll calls. Since the pulses from this timer constituted the basis on which the operating telephone company would charge the customer, it was essential that the timer be thoroughly reliable and highly accurate.

The problem of making such a timer available was referred to the Electro-Mechanical Engineering group by the Systems Engineers. The original requirements called for a device which would produce a short pulse 75 seconds after timing started, and then pulse at accurate 60-second intervals thereafter. Further requirements included fast reset operation, 60 cycle synchronous drive, and D.C. clutch control for driving and reset.

Operating telephone companies usually allow the toll subscriber a brief period in which to terminate his call. In order to continue this "disconnect allowance" in the Toll Ticketing system, it had been decided to make the first timing interval 75 seconds, frequently referred to as the "long first minute." This interval has subsequently been reduced to 5 seconds.

Letters were written to seventeen different companies specializing in timers, outlining our requirements, and requesting their cooperation. With no exception, we drew a blank. Some replied that they had no engineering manpower available, and others frankly said they could not do it. One reply amused us — to quote in part, they wrote, "To build a timer to your specifications, you might as well ask us to design and build a Cadillac automobile."

Accordingly, the Electro-Mechanical Engineering group undertook the design and development of the much-needed timer. The first design was built on a commercially available clutch-controlled sychronous drive motor. The special timing was derived from a six-lobe cam, made with undercut portions, causing it to resemble a buzz-saw blade. A spring-loaded cam follower operated the timing contacts and also provided a fast reset when the driving clutch was released.

As the Toll Ticketing development continued, the circuit group added further requirements to the Call Timer. Additional contacts were needed, to pulse another circuit, with the timing adjustable in the range from 1 to 15 seconds after the start of timing. An adjustment was also requested on the "minute" pulse, to make the first minute adjustable from 60 to 90 seconds. A longer pulse (100 to 200 milliseconds) with fast "make" and "break" was requested.

In order to meet these additional requirements, an entirely different mechanism was designed. The six-lobe undercut cam was replaced by an adjustable "lost-motion" arrangement, snap-action switches were used to provide the fast "make" and "break," a spiral spring and friction clutch were added to provide resetting, and a second cam and switch were added. Referring to Figure 1, which shows in schematic form the arrangement of the parts, we start with a synchronous type driving motor similar to those used for electric clocks. The output of the motor is controlled by a magnetic clutch, which permits the output shaft either to drive ahead or spin freely. A hub on this shaft carries a timing disc and two adjustable fingers which can be set and clamped

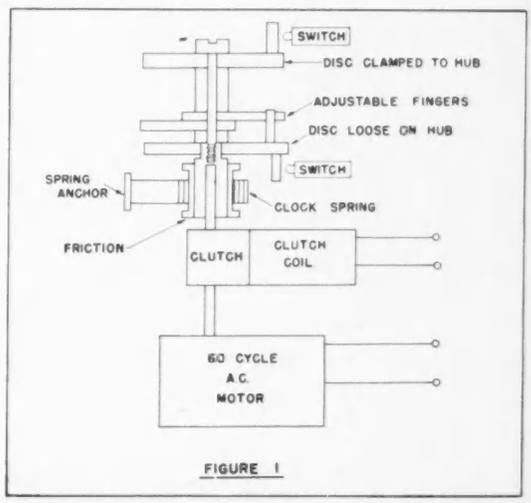


FIGURE 1

in any position. Another disc rides loose on the hub and carries a driving pin which engages the adjustable fingers. Spacing between the fingers determines the lost motion. Pins on the timing discs operate snap-action switches. A spiral-type clock spring, which is wound up as the timer drives forward provides the necessary torque to reset the discs to the zero position when the clutch is disengaged. A friction controlled slip clutch prevents overwinding of the clock spring during long timing periods.

Figure 2 shows in schematic form the relation of the components during the timing and resetting cycles. The upper disc, being rigidly connected to the clutch output shaft, starts immediately when the clutch is engaged. The operating pin actuates the switch, sending a short pulse (approximately 200 milliseconds), and continues to send a pulse every 60 seconds. For the lower disc, the driving fingers start to move when the clutch is engaged. After the lost motion is taken up, the second finger engages the driving pin on the disc and the timing disc then moves forward. After the disc has moved forward a little less than one revolution, the switch is actuated, sending a short pulse, which is then repeated every cycle thereafter. The lost motion added to the time for the first cycle creates a desired "long first minute."

Actuators on the snap-action switches are equipped with "overthrow" devices which reduce the torque necessary to reset the timing discs to zero, and also eliminate any pulsing during reset.

Figure 3 shows the pulsing pattern for this timer. The top cam produces a pulse shortly after the clutch engages, followed by other pulses at one-minute intervals. The lower cam produces its first pulse more than a minute after engagement of the clutch, followed by pulses at regular one-minute intervals.

In the Stromberg-Carlson Toll Ticketing system, the call timer is used to provide certain supervisory functions and also to time the calls for billing purposes. This is the way it is used: When a subscriber initiates a toll call, the adapter associated with a particular trunk is seized. This starts the timer driving motor. When the connection is completed and answer supervision returns, the timer clutch is engaged. Timing starts from this point, and the pulses produced by the lower cam are recorded on the magnetic tape of the Toll Ticketing recorder. It is apparent that when three pulses have been recorded, the connection has been made for more than three minutes and overtime can be charged.

The top cam and switch provide a pulse which enables the supervisory circuit to differentiate between answer supervision and busytone. Flashing supervision, which is returned to the calling office when a busy condition is encountered, does not permit the clutch to remain operated long enough for the top cam to actuate its switch. However, valid answer supervision, being continuous for at least 1-1/4 seconds, allows the clutch to be engaged long enough for the top cam to actuate its switch. This indicates to the supervisory equipment that a chargeable call has been made. In cases where the called party is busy, no record is made of the call and no charge is made.

While the call timer is designed to fulfill certain specific circuit and operating requirements, it can be readily adapted to other requirements. Using driving motors of speeds other than 1 RPM, other time periods can be obtained. Different cam settings and arrangements can produce a variety of first period intervals, coupled with the fast reset-to-zero feature. The Toll Ticketing Call Timer is, therefore, a versatile and precise type of special timing instrument which affords the means of solving otherwise difficult timing problems.

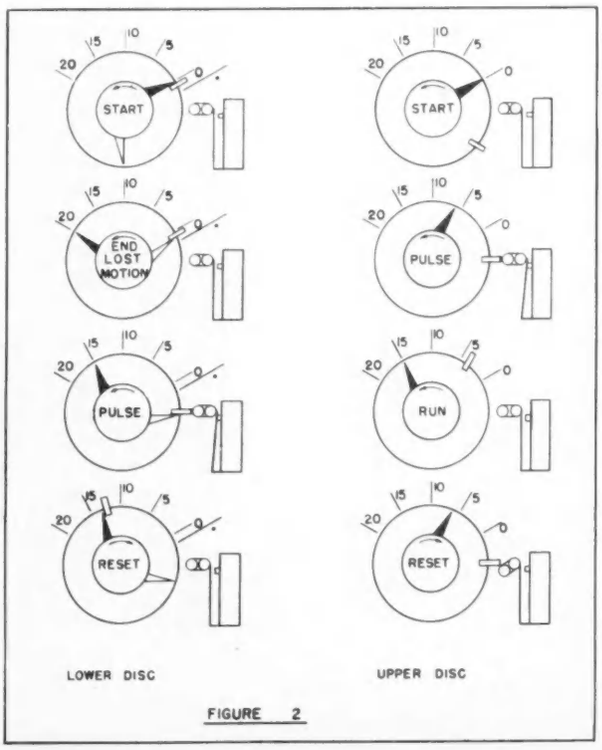


FIGURE 2

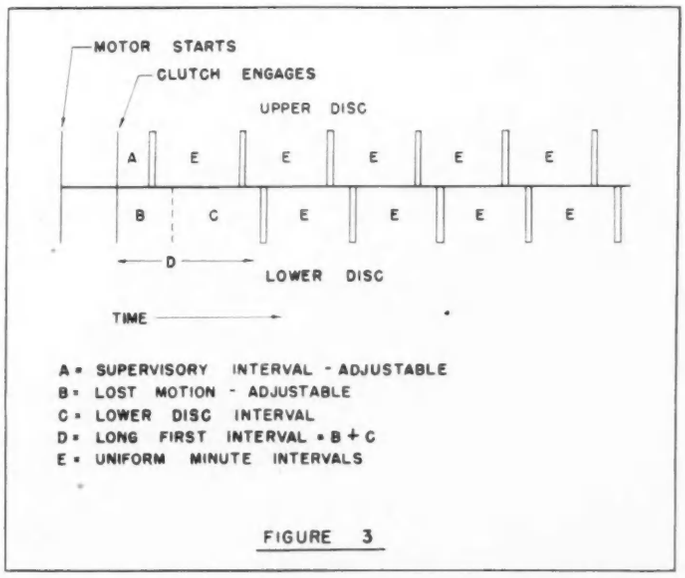
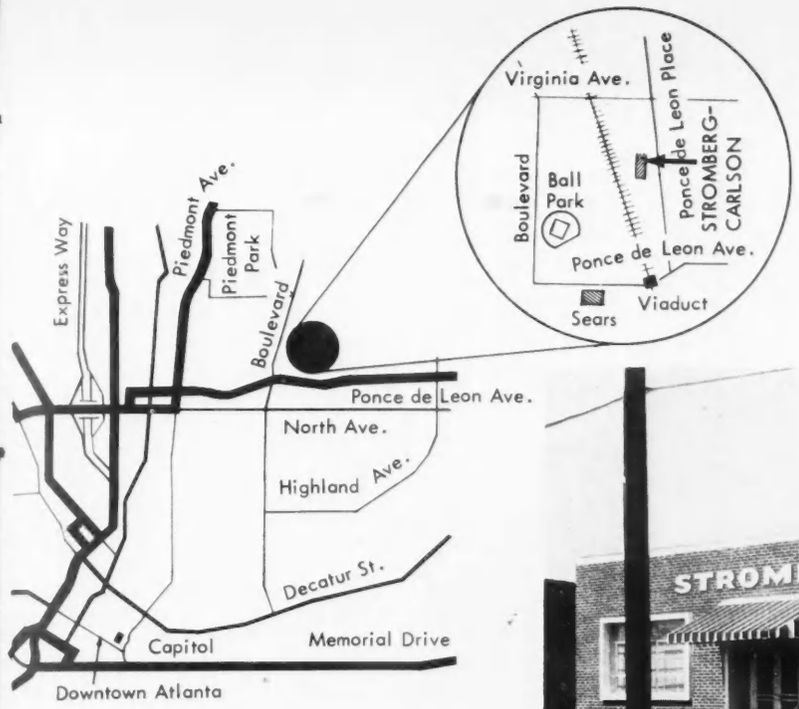


FIGURE 3



New home of the Atlanta Branch, Stromberg-Carlson Company. Mr. W. L. Mollands extends an invitation to pay him a visit on your very next trip to Atlanta.

New Address:

750 Ponce de Leon Place, N. E.

Atlanta 6, Georgia

Atlanta Branch expands with New Office and Warehouse

All eyes have been on the Southeast of late; continuing and evolutionary growth has astounded even the most optimistic. Stromberg-Carlson, through its Atlanta Branch Office, is now ready to offer increased services to all its customers in the eight-state area comprising this territory.

W. L. Mollands, Manager, Atlanta Sales Branch

The new branch office building and ample warehouse facilities officially opened this month, provide manager W. L. Mollands and his augmented staff with the operating base they require. A private railroad siding and truck docks will expedite the flow of vital construction materials, while the more than 16,000 square feet of storage space will permit a substantial inventory of standard equipment stocks.

The welcome mat is out — the door is open for you.

Supplies? Yes, indeed!

New office manager T. W. Ball is first to move into new home; checks last details before opening.

your eyes will pop!

your pulse will quicken

you'll think you're walking on air

and you'll be in the world of tomorrow

when you see the

STROMBERG-CARLSON EXHIBITS

Rms. 504A, 505A, 507A and 509A

see you at the

U. S. I. T. A.

Convention at Conrad Hilton Hotel, Chicago, Ill.

October 15-16-17

The Kersh family gathers in the equipment room of the Home Telephone Company of Humble, Texas, at cutover time. Seated is D. V. Kersh. The standing Kershes are J. D., Judy, Jennie Beth, Mrs. Hayden, Hayden, Mrs. D. V. and Edwin.

They're Proud of XY in Humble, Texas

The Kersh family of Humble, Texas —fast-growing suburb of Houston— realized a 38-year dream this summer as they completed conversion of their exchange to XY Dial operation.

The Home Telephone Company could well be called the "Family Telephone Company" for everyone has an active part in this family enterprise. Guiding spirit is still Mr. D. V. Kersh, in spite of a crippling accident in 1944 while working on the lines. Edwin Kersh is in charge of all engineering; Hayden Kersh heads construction and maintenance; younger members pitch in whenever they can help most.

The cutover to dial is not the end of their modernization program: toll ticketing equipment is planned for the near future.

Meet Terry Ball

New Office Manager
Atlanta Sales Branch

Coincident with the opening of the new Atlanta branch office and warehouse, Terry W. Ball has been appointed Office Manager.

After preparatory and college work in Industrial and Office Management, Mr. Ball became assistant supervisor of factory clerks at the Stromberg-Carlson main plant in Rochester, then material control supervisor, and during the postwar period was a government contracts administrator. Just prior to his present assignment he worked in the national sales engineering section at Rochester.

Mr. Ball saw war service with the 101st Airborne Division. Married in 1953 to the former Margaret Hawkins of Rochester, the Balls and their 2-year-old son, Mark David are now living in Decatur, a suburb of Atlanta.

In the Midst of Tomorrow

Things are happening at Stromberg-Carlson

Microwave Experimental Link The recent completion of a 60-mile experimental microwave radio relay link, which will be used to field test new ideas and new equipment from the Stromberg-Carlson research laboratories, symbolizes the company's unceasing efforts to bring the world of tomorrow ever closer.

The microwave link will provide for testing, research and development in connection with multiplexing equipment. It will also serve as a demonstration facility for potential customers.

In addition, one of the stations in the link is equipped with special apparatus to assist the Radio Astronomy Laboratory of Cornell University in research on tropospheric scattering of short-wave radio signals.

A key station in the Stromberg-Carlson experimental microwave link is the tower atop Hathaway Hill in East Penfield, N. Y. The largest of the four dishes is for research on tropospheric scattering of short-wave radio signals, to be carried on for Cornell University's Radio Astronomy Laboratory.

More Space For Telecommunications Proceeding ahead of schedule is construction of two new buildings adjoining the Stromberg-Carlson main Rochester plant. One of the structures, which will house part of the manufacturing facilities of the Telecommunication Division, will be ready for occupancy October 1.

A new administration and research building will be completed in a year or less.

The significance of this new construction is two-fold. It means increased production facilities to meet present and future needs. And, perhaps even more important, it means greater facilities for an accelerating program of research and advanced development.

Stromberg-Carlson engineers and scientists are working today with the communications tools of the future. As one of our friends put it, "We're up to our ears in tomorrow."

A new building rises rapidly on land adjoining the main Stromberg-Carlson Rochester plant. This is one of two buildings under construction and will house added production facilities for the Telecommunication Division. The other building will be occupied by administrative and research facilities.

CONTINUING PROGRESS
for Sarasota
SITE OF NEW
3-STORY DIAL EXCHANGE
AND BUSINESS OFFICE
PENINSULAR TELEPHONE COMPANY

Installing crew gathers for a group picture after a job well done. Front row, left to right: W. D. Fordham, E. D. Edwards, C. W. Lamb, J. E. Engler, W. H. Lang, C. R. Cranor, R. H. Giddings and M. J. Trenton. Mr. Trenton is Toll Board Foreman.

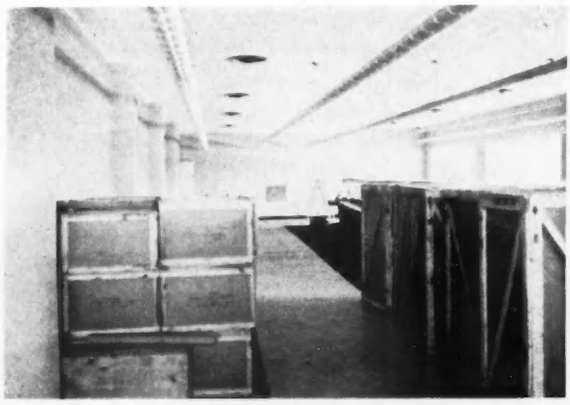
Second row: V. D. Terry, G. C. Wood, J. F. Kelley, B. S. Lang, D. K. Dodd, H. H. Baust, W. B. King, C. H. Key, E. R. Haskins and J. C. Brewer.

Rear row: L. R. Manning, F. S. Nye, H. D. Stone, J. B. McGee, E. R. Winslow, Foreman in Charge; D. R. Martin and A. I. Gifford, Foreman for Sub-Offices; and C. D. Pitrello.

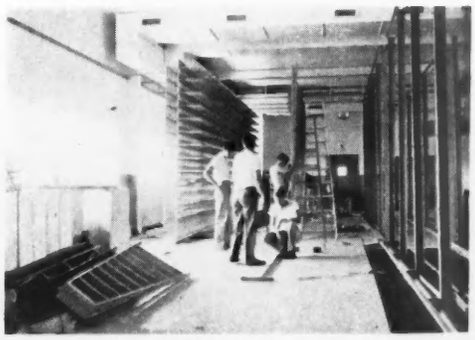
Packing Boxes to Progress

These are exciting days at the Sarasota (Florida) office of the Peninsular Telephone Company. The sign above was the only outward evidence of things to be when your reporter visited Manager Taylor Scott in July 1955, but the message is as applicable today as then. Progress is the watchword!

The impressive building is designed for the lusty growth which has been — like the directional sign in the foreground — the ONE WAY this great company has followed. All of the photos shown on these two pages, showing the first steps in the installation of a metropolitan XY Dial office, were supplied by Edward Winslow, Stromberg-Carlson installation foreman at Sarasota.

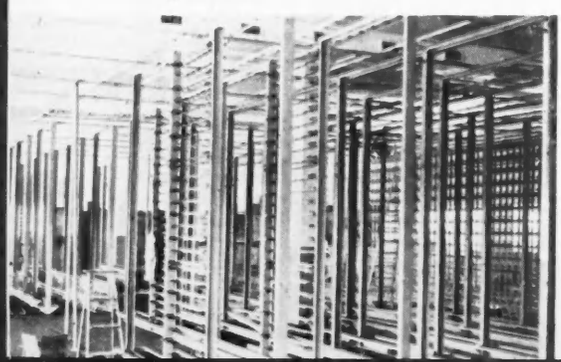


Packing boxes — the first sight to greet the installers. When this photo was taken, several cases had been opened and the toll position line-up had started to take shape.



The Main Distributing Frame is normally the first central office equipment to arrive. With this in place, the customer can start connecting outside cable while the dial switching equipment frames are being erected.

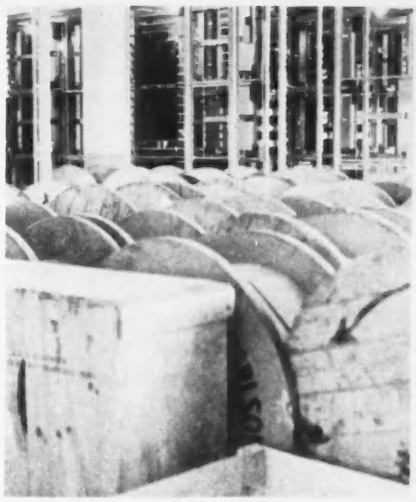
Bay framework grows like a tropical forest. Vertical members are braced with cable racks and superstructure. In this office there are 10 rows of double-sided equipment bays, easily capable of handling the 7,400 lines and 20,000 connector terminals presently being installed.



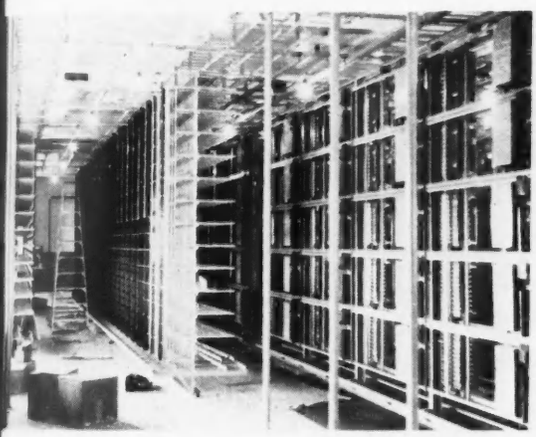
Major toll center in nationwide toll dialing network, the toll room will have 24 positions initially, with every modern feature including key-sender operation.

Naturally any installation begins with a building, and this Sarasota office is a beauty. Everything which will increase efficiency or foster good public relations is included.

Cable Runs -- Part 1 of
at Peninsular's Sarasota Office

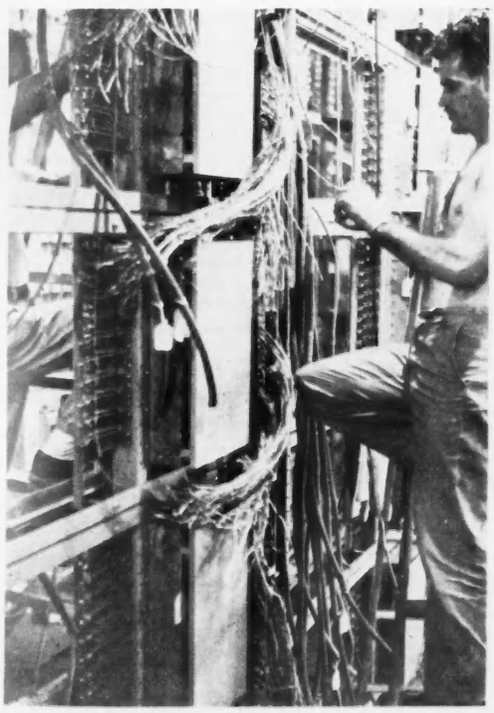


Cable — miles of it! Photo shows a few of the eight-four reels used in the inside wiring. There's half a mile of cable on each reel.

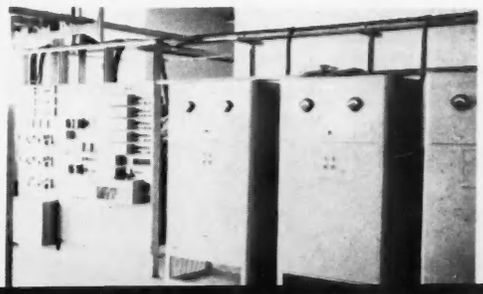


The Intermediate Distributing Frame in relation to the switching bays. Shelf equipment has now been mounted, preparatory to cable running.

Stromberg-Carlson installers have a reputation to maintain when running and lacing connector and line cables. Note that a double rack is used to insure a neat cabling job with minimum of crossovers.



This looks complicated — and it is. Wiring connector bays requires dexterity, patience and care.



Thoroughly tested before shipment, the main power board and charging equipment is placed on the first floor. On the third floor, adjacent to dial equipment, is another power board and supervisory panels.

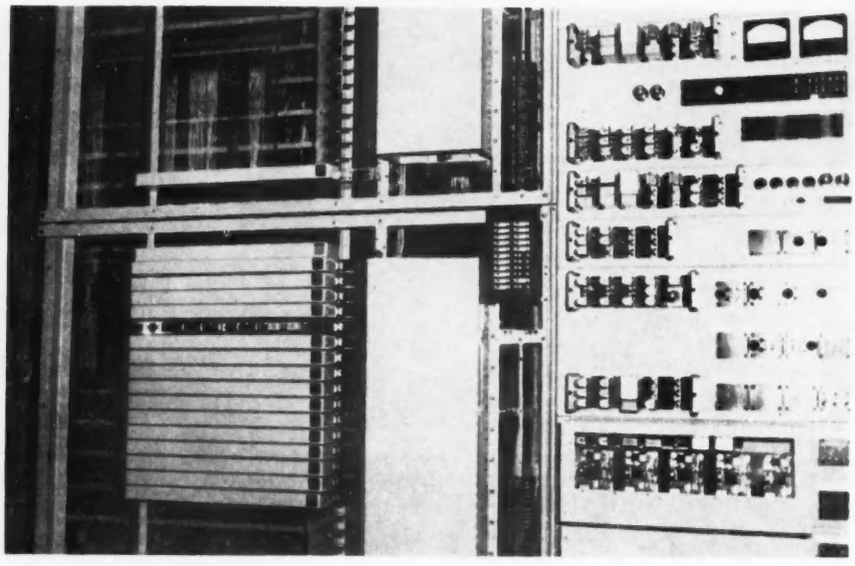
Tidewater Oil, Boats, and Good Telephone Service

Port Aransas, Texas, draws its livelihood from its maritime setting — on Mustang Island, opposite Corpus Christi on the southeast Gulf Coast. Fine summer homes, beach and sailing sports have made this a long-popular summer resort. Recently the offshore oil activity has made a bustling port out of this quiet harbor. To better serve this thriving community the Mustang Telephone Company has just cut over the 400-terminal XY Dial exchange shown here.

This is Port Aransas, Texas . . .

and these are the men who have placed XY Dial service in the community: L-R Mr. Boone Walker, manager of the Mustang Telephone Company; Elmo Landrie, service engineer and Carl Price, sales representative, of Stromberg-Carlson.

They Showed Them in Missouri



After cutover to XY Dial on July 1, the St. James Telephone Company is able to serve three times as many subscribers as before. It was a big day for company manager, Jack E. Bartrums, and M. T. Matlock, plant superintendent.

The old manual switchboard has been eliminated, except for rural long-distance, police and fire calls. Along with dial service the company is offering its subscribers new two-tone and full-color instruments. Subscribers enjoy double bargains.

Operators are busy at the St. James manual switchboard before cutover to XY Dial on July 1 of this year.

New XY Dial equipment graces the equipment room of the St. James Telephone Company. The Missouri Independent can now serve three times as many subscribers.

STROMBERG-CARLSON TRANSMITTER

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A DIVISION OF
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Rochester 3, New York
GEORGE B. FORBES, *Editor*

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the BACK of the BOOK

By John G. Reynolds

A Day To Remember

LONG LINES magazine tells us that a car crashed into two poles on Main Street in Sayreville, N. J., recently and caused one of the spookiest mishaps Syreville or any other town has ever known.

Telephone wires on one pole merged with utility wires on the other, so that when a man went to make a phone call, he turned on all the lights in Sayreville, and if he switched on the lights, all the telephone bells began ringing.

An even odder quirk came when one switching on of lights touched off the town's 10 sirens which customarily means no school for the day. Children were saddened to learn it was a mistake.

It was a day long to be remembered in the normally quiet community.

Trouble-Maker

A JERSEY CITY newshawk has stumbled upon what must be the saddest sack in six states. His name (actually) is Peter Rabbit III, and he has fallen into the clutches of the law for misdemeanors on numerous occasions.

"It's always the same story, he laments. "I'm getting along O.K. till some one asks my name. It's when I answer a phone call—'Peter Rabbit' the trouble really starts!"

African Story

RECENTLY one of our authors recalled the anecdote about a squad of telephone men assigned to stretch a new line across a remote district in the Zulu country.

We understand that a Zulu chief and his advisor watched the operation with vast disdain.

"White men idiots," decided the chief. "Put wire so high, livestock can walk right under it."

1956 Political Conventions

THE GREATEST AUDIENCE in history — as many as 150,000,000 Americans — had a chance to be "roving delegates" at the two 1956 national political conventions through the magic of television and the Bell System's vast intercity TV network. The dramatic action came "live" from the convention halls in Chicago and San Francisco.

The television hook-up was only one part of the communications job. For the press, telephone companies installed nearly 600 additional teletypewriters in the convention cities. A network of 760,000 miles of teletypewriter circuits carried the news. Also, over 1,500 radio stations received the program from the convention halls via the Bell System radio program network. In addition to the facilities for the press, television and radio people, other equipment was provided for the throngs of delegates and visitors at the two cities.

At the Democratic national convention in Chicago, record amounts of equipment, and facilities were in operation at the convention site and at other points in the city. The 50 TV channels provided are an increase of 72 per cent over the number used for the 1952 conventions. Helping to keep these channels operating were 54 micro-wave "dishpan antennas" spotted around the city. A Bell Telephone Center at the convention hall was staffed by 110 uniformed telephone men and women from all departments. This center served delegates and visitors 24 hours a day.

At the Republican national convention in San Francisco's Cow Palace, orders for 40 TV channels were placed for the convention. In addition, other special facilities — similar to those used at Chicago served press and radio people, the delegates and visitors.

Alice-In-Taxland

THERE IS an Alice-In-Wonderland quality about our federal income tax laws, with their extremely high upper-bracket rates. *U. S. News & World Report* gives an example.

The magazine says: "A baseball player's angry gesture, during a ball game, may cost the Federal Government $4,200 in income taxes. It also may bring the athlete a personal profit of $4,200."

Does that sound absurd? Well, here's the true story. The world's highest-salaried ball-player ($100,000 a year) was fined $5,000 by his club for a display of temper toward the fans. This is considered a business expense, for the reason that the fine must be paid if the player is to keep on practicing his profession. Thus, his taxable income is reduced by the $5,000.

After deductions, the top tax rate on this player's income is 84 per cent. So the fine gives him a tax reduction of $4,200, leaving him only $800 out of pocket.

But that isn't all. Admirers of the player are reported to be making up a fund to pay the fine. U. S. News says: "If they give him $5,000, that amount is not taxable at all. In that case, the ballplayer would stand an $800 loss and a $5,000 gain, for a net profit of $4,200."

Very few of us have any personal experience with either $100,000 incomes or $5,000 fines. But this factual illustration indicates just how confused, inequitable, and generally unsound our tax laws are. Like Topsy, they just grew — and grew into a crazy-quilt. That's why sentiment for a complete overhaul has been snowballing.

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Automatic's new TRANSISTORIZED repeaters cost so little you can use them on tributary and inter-office trunks—even on long subscriber lines! Used in combination, they overcome up to 85% of the line loss, provide up to 14 dB gain. On new installations, you can more than pay for them from your savings on outside plant construction.

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